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Crafting Digital Cinema: Cinematographers in Contemporary Hollywood

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Crafting Digital Cinema: Cinematographers in Contemporary Hollywood

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Dedication

For Julie

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Crafting Digital Cinema: Cinematographers in Contemporary Hollywood

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In the late 1990s, motion picture and television production began a process of rapid digitalization with profound implications for cinematographers in Hollywood, as new tools for "digital cinematography" became part of the traditional production process. This transition came in three waves, starting with a post-production technique, the digital intermediate, then the use of high-definition video and digital production cameras, and finally digital exhibition. This dissertation shows how cinematographers responded to the technical and aesthetic challenges presented by digital production tools as they replaced elements of the film-based, photochemical workflow. Using trade publications, mainstream press sources, and in-depth interviews with cinematographers and filmmakers, I chronicle this transition between 1998 and 2005, analyzing how cinematographers' responded to and utilized these new digital technologies. I analyze demonstration texts, promotional videos, and feature films, including *Pleasantville*, *O Brother Where Art Thou*, *Star Wars: Attack of the Clones*, *The Anniversary Party*, *Personal Velocity*, and *Collateral*, all of which played a role in establishing a discourse

and practice of digital cinematography among cinematographers, producers and directors. The challenges presented by new collaborators such as the colorist and digital imaging technician are also examined. I discuss cinematographers' work with standards-setting groups such as the Society of Motion Picture and Television Engineers, Academy of Motion Picture Arts and Sciences, and the studio consortium Digital Cinema Initiatives, describing it as an effort to protect "film-look" and establish look-management as a prominent feature of their craft practice. In an era when digitalization has made motion pictures more malleable and mobile than ever before, this study shows how cinematographers attempted to preserve their historical, craft-based sense of masterful cinematography and a structure of authority that privileges the cinematographer as "guardian of the image."

Table of Contents

List of Figures

Chapter 1: Crafting Digital Cinema

Cinematography has a few golden ages. The early days, when Billy Bitzer, alongside D.W. Griffith, pioneered cinema as a craft and an art form; the mid-century, when studio cameramen like Gregg Toland found new expressiveness in black and white cinematography and Technicolor first dazzled audiences; in the late 1960s and 1970s, when émigré cinematographers revitalized the craft with distinctive, European-style photography. All of these eras had one thing in common: the medium of film. To the extent that cinematography had a shared legacy of accomplishment and a pantheon of artist-craftsmen to look up to, it was bound by a reverence for the alchemy of film, of chemicals on celluloid, a perforated strip, and a machine to run it through. This is not to say that film and its related technologies stood still over the span of the twentieth century. Workers of every era grappled with new tools and techniques. Every era of cinematography, golden or not, has a story of craft confronting and absorbing technological change. Over the last two decades, though, the technological constant of film, a medium that many considered the root and branch of cinematography, has given way to a new alchemy: digital cinematography. This dissertation describes that technological transition and uses it to relate one area of craft practice, cinematography, to the larger production culture of Hollywood. It shows how a craft culture, as a locus of aesthetic, technological, and institutional authority based in specific historical circumstances, negotiated and redefined itself within this new technological regime, struggling to maintain a structure of authority consistent with its past practices and privileges.

Through the 1990s, many aspects of motion picture production adopted digital production tools. The Avid computer-based editing system was first marketed in 1989 and bridged the gap between film and the sorts of "non-linear" editing techniques enjoyed by editors working with video.[1] Editors in movies and television increasingly adopted the systems despite a more complex workflow that entailed transferring film footage to videotape, digitizing the video, editing, and then conforming the film negative to the digital edit. Despite the additional steps in this process, the convenience of avoiding tape- or glue-splicing and the ability to instantly review one's work led to the rapid adoption of computer-based editing. An HBO movie, *Teamster Boss: The Jackie Presser Story* (1992), the low-budget drama *Lost in Yonkers* (1993), and a star vehicle, *The Fugitive* (1993) demonstrated the viability of Avid to producers and the studios. When Walter Murch, an academy-award winning editor and sound designer, cut portions of *The English Patient* (1996) on an Avid, and James Cameron and his team of editors used the system for *Titanic* (1997), the transition was all but assured.[2] By the end of the 1990s, most feature films were edited digitally, then conformed back to film for printing and distribution.[3] Likewise, by the mid-1990s the field of special effects had widely adopted digital techniques. In 1993, three films demonstrated the extraordinary possibilities of digital effects: *Super Mario Brothers*, *Jurassic Park*, and *The Last Action Hero.* These films used digital production for brief sequences of photo-realistic animation (such as the dinosaurs in *Jurassic Park*), wire-removal (erasing safety harnesses from stunt workers, for example), or frame manipulation (such as compositing miniatures with

[1] Kirsner, *Inventing the Movies*, 80. "Non-linear" editing has become a synonym for digital editing. Previous generations of video-based editors required a program to be built sequentially (or "linearly") from beginning to end; digital editing allowed an editor to insert new frames anywhere in the sequence of a program, a much more flexible process. Cutting actual film, of course, had always been "non-linear" in that sense, which was one reason film editors had resisted adopting video-based tools.

[2] Cameron is credited as an editor of *Titanic*, along with Conrad Buff and Richard A. Harris.

[3] Bordwell, *The Way Hollywood Tells It*, 155

live action, adding haze, motion blur, and other effects).[4] By this time, visual effects service providers such as Digital Domain and Industrial Light and Magic had taken a prominent place in planning and realizing movie images. The effects shots they created would become a major component of the big-budget blockbuster and franchise projects upon which the media conglomerates were increasingly reliant.[5] Not long after these developments, the producer George Lucas (founder of Industrial Light and Magic) announced his intention to complete his Star Wars saga with three more episodes, using digital production tools and techniques almost entirely, including digital video cameras.

In April 1993, Bob Fisher, a journalist and former editor of *AC*, wrote a two part article titled "Digital Cinematography: A Phrase of the Future?" "Digital technology," he wrote, "could prove to be either the cinematographer's fondest dream or his worst nightmare."[6] Fisher's use of the term digital cinematography was one of the earliest conjoining of these two terms; in 1993, digital still photography was in its infancy and digital movie cameras were still a fantasy of engineers and technologists. Film-based cinematography was the dominant workflow for film and prime-time television and, beyond live broadcast or video-based news or documentary production, it was the only workflow in town; cinematography meant film-based image-making.

For Hollywood cinematographers the transition held profound implications for their practice and privileges, as craft workers with decades of tradition, expertise, and institutional relationships built around the legacy technology of 35mm film. Digitalization affected the craft community of cinematographers in three successive

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[4] See Michele Pierson, "No Longer State-of-the-Art: Crafting a Future for CGI," Wide Angle 21:1 (January 1999), 43. Also Piers Brozny, *Digital Domain*. (New York: Billboard Books, 2001) and Michael Rubin, *Droidmaker: George Lucas and the Digital Revolution*. (Gainsville: Triad Publishing, 2006) for descriptions of the development of special effects as a sub-industry.

[5] Thomas Schatz, "New Hollywood, New Millinnium," in *Film Theory and Contemporary Hollywood Movies*, edited by Warren Buckland (New York: Routledge, 2009), 20.

[6] Bob Fisher, "Digital Cinematography: A Phrase of the Future?," *American Cinematographer*, April 2003, 50.

waves between 1993 and early 2000s, beginning with the emergence of the *digital intermediate*, which was a new way of revising color and other image properties in the latter stages of production, then the use of *video- and digital-origination* (i.e., alternative means of capturing images) during principal photography, and finally the standardization and diffusion of *digital movie exhibition*.[7] In what follows I trace cinematographers' efforts to catch, ride, and finally direct these waves of change up to the year 2005, when the studio consortium Digital Cinema Initiatives, with assistance from cinematographers, released its Digital Cinema Specification, a large step toward re-casting the production and exhibition of movies as a wholly digital experience.

Through interviews and observations of cinematographers at work and analyses of movies produced with digital tools, I will examine how this professional community responded to a rising tide of technological change that gradually came to be seen as a crisis for the craft of cinematography. These responses were neither a matter of resisting disruptive technologies, nor acquiescently managing technological change under the aegis of producers and studios, but rather revealed a craft culture developing and enacting strategies for maintaining authority within a system characterized by an established production culture, shared conceptions of style and aesthetics, and constant negotiations over time, expense, reputation, and credit. Indeed, a relatively small cadre of accomplished cinematographers demonstrated considerable influence in shaping the technological future of digital cinema. In the course of defining digital cinematography, though, their relatively stable craft tradition began to fracture into specializations and

[7] A fourth wave, three-dimensional cinematography, has emerged in recent years. Producers of large-format IMAX and theme park rides developed 3-D technology and techniques through the 1990s and, after 2003, 3-D production and exhibition entered mainstream cinema with the release of several movies marketed to children, *Spy Kids 3-D* (2003), *Polar Express* (2004), and *Chicken Little* (2005). After 2005, 3-D releases of most childrens' and action titles increasingly became a part of the regular release strategies for Hollywood studios. The processes of developing digital origination and digital projection discussed in this study enabled the wider adoption of 3-D and although 3-D cinematography is not treated directly in this project, it was emerging as a domain of specialized practice among cinematographers at this time.

sub-crafts in response to new production methods, with consequences that are still unfolding.

THE MOTION PICTURE PRODUCTION PROCESS

What is "craft" in the context of moving image production? What is the nature of its authority in the collaborative process of producing film and television? I will describe the relationships of the craft areas to each other in more detail in Chapter Two, but an overview of the production process will provide some useful context for understanding the division of labor and technologies described below. The traditional production process includes five phases: financing, scripting, pre-production, principal photography, and post-production.[8] Finance is typically in the realm of either studios or producers and is largely bracketed outside of this study. Scripting and pre-production (often linked together as the "development" process) are the phases of imagining and writing a story idea, typically developed over several drafts and culminating in a shooting script, and preparing for principal photography. In this stage, the primary members of the creative team, which usually include at minimum the producer, director, production designer, and cinematographer, work on finding locations or building sets, gathering the necessary script elements (actors, props, etc.), doing "pre-visualization" work such as sketches and storyboards, and assembling or hiring the necessary talent, artisans, technicians, and technology for the rest of production. Depending on the budget and scale of the project, a crew may constitute a handful of people, or number in the hundreds. During principal photography, a production crew stages and records all of the elements called for in the shooting script. Post-production is the assembly phase, when an editor, under supervision

[8] See Bordwell and Thompson's *Film Art* for a more detailed overview of this process. David Bordwell and Kristin Thompson, *Film Art: An Introduction* , 8th ed. (New York: McGraw-Hill, 2008), for the historical development of the pre-shooting, shooting, and post-shooting structure, see David Bordwell, Janet Staiger, and Kristin Thompson, *Classical Hollywood Cinema: Film Style and Mode of Production to 1960*. (New York, Columbia University Press, 1985), 142-153.

of the producer or director, edits the footage together, and special effects, sound elements and music are created and added. Final revisions to the "look" of a film through laboratory- or computer-based techniques are applied and the prints are prepared for distribution and exhibition.

This three-stage model of production—pre-production, principal photography, and post-production—developed, as Bordwell, Staiger, and Thompson have described, with the creation of an industrialized process of filmmaking in the first decades of the twentieth century. It provided the basis for the highly rationalized studio system and was a remarkably flexible institution, capable of producing highly differentiated, novel entertainments in a relatively standardized fashion.[9] After the integrated studio system was dismantled, this production process as a general outline has remained the dominant mode of production in feature film production to the present day.

When television emerged in the 1950s, networks and producers developed other modes of production, such as live broadcast, live-to-tape, telefilm, and made-for-television movies. On a superficial level, some of these modes of production resembled the studio system's three-stage model, but, as Newcomb and Alley among others have shown, the structure of authority in television production was quite different.[10] In many cases, for instance, writer-producers, talent agents, or programming executives emerged as powerful "authorial" voices in television, unlike film, where the studio, producer, or director had been considered the creative leader. Nonetheless, on the craft level, certain key roles have proven remarkably persistent in the creation of long-form narrative entertainment, whatever the mode of production. The production designer, the

[9] Bordwell, et al., *Classical Hollywood Cinema*, 96, and 142-153.

[10] For discussions of the relationship of the studio system to television production and shifting structures of authority, see Horace Newcomb and Robert Alley, *The Producer's Medium* (New York: Oxford University Press, 1983); 3-45, also Todd Gitlin, *Inside Primetime*, (New York: Pantheon Books, 1983) and Tino Balio's "Introduction to Part I," in *Hollywood in the Age of Television* (Boston: Unwin Hyman, 1990). 9-10, 18-19.

cinematographer, and the editor—typically termed *department heads* as they manage a staff of other artisans and technicians—are part of the creative core of this form of production. Over the last thirty years, another department head, the visual effects supervisor, has taken on new prominence.[11] The work of a visual effects supervisor often bridges the production and post-production phases as she oversees the creation of original "special effects" material and works to integrate it with the principal photography. In some cases, depending on the scale and organization of production, all of these positions may be divided, with multiple cinematographers, visual effects teams, or editors on a project. However, in the service of organizational clarity and by union rule, there is almost always a "lead" in these craft areas.

DIGITALIZATION AND THE PRODUCTION PROCESS

One of the underlying questions of this study is how digital tools have enabled different ways of making film and television programs, as in low-budget productions that rely on people performing multiple "hyphenated" roles, or in animated feature films where the rules of physical production don't apply. Likewise, digital tools have created new roles in the traditional mode of production. For example, the digital intermediate (DI) added a new step in the post-production process by allowing a finished or nearly finished movie (photographed on traditional film) to be scanned frame by frame as a computer file for revisions to shots and close manipulation of colors from shot to shot, or

[11] Visual effects as a craft area has not attracted much academic attention. For discussions of visual effects history and technique, See Richard Rickitt, *Special Effects: The History and Technique* (New York: Billboard Books, 2000); Shilo McClean, *Digital Storytelling: The Narrative Power of Visual Effects in Film* (Boston: MIT Press, 2007), Piers Bizony, *Digital Domain* (New York: Billboard Books, 2001), 12-42; also introduction to the theme issue "Digital Visual Effects and Popular Cinema" in *Film Criticism*, September 2007, 2.

even within shots for expressive effect.[12] As Charles Swartz, Director of USC's Entertainment Technology Center said:

> I've said to friends I think we should call it the process that was formerly called post-production, because it is a misnomer now…the role of the cinematographer was to create the image with the crew on the set and then pretty much guard that what ended up in the eventual movie as shown was what was intended on the set. And that is why we were sequential. There was production and then there was postproduction. But that doesn't exist anymore. With digital post-production, you can do just about anything to that image that you want to without loss of quality.[13]

Digitizing and working with film images as digital files started in the late 1980s, first by graphics and visual effects creators working largely in TV commercial production and then in the emergence of computer-based editing. As described above, film editors and special effects producers had seen their craft practices upended by the emergence of computer-based animation and editing in the early 1990s, a transition that foreshadowed the cinematographers' experience later in the decade. Still, digital cinematography seems to have been a qualitatively different and more disrupting development, a threat the DI brought into focus. The DI was similar to an older procedure, "color correction," by which a cinematographer supervised laboratory personnel to revise the color properties of particular shots for either expressive effect or to better match the surrounding footage. A relatively blunt instrument, color correction was, in effect, a remedial process. The DI allowed a new degree of fine, expressive control for special color effects and tonal variation, and it permitted these changes in post-production, the assembly stages when a cinematographer's influence on a project was waning. Most significantly for this study's concerns, the DI led to the creation of the *colorist* (a specialist in defining and revising qualities in digitized images) which also disrupted some of the traditional lines of authority in production. As the DI, followed by digital origination, and finally digital

[12] See Aylish Woods, "Digital Intermediates and Micromanipulation of the Image," *Film Criticism* 32:1 (Fall 2007), 72-94.
[13] Charles Swartz, interview by the author, March 27, 2005, transcript.

exhibition became technologically feasible, the cinematographer craft community was engaged to develop, test, and explore these new modes, but also deeply disturbed by depictions of cinematography as an antiquated craft on the verge of obsolescence.

Caldwell's book, *Production Culture*, has informed my analysis of cinematographers' responses to digital cinematography. Caldwell closely examines the film and television industries as a work culture with idiosyncratic forms of negotiation and communication, based on trade stories and deep texts, imagined community, and craft-based investments in long-standing technological regimes. In production culture, craft-level workers struggle to maintain and protect some degree of authority and influence in creative, collaborative relationships that demonstrate, as Caldwell writes, a high degree of reflexivity, continuously using and creating culture in performances of creative and critical competence—reflecting on the past and future of media in both private (i.e., interpersonally) and public modes (i.e., through promotional discourses).[14] I describe this as a struggle to make "decisions that stick," a definition of authority that I see as the primary struggle within craft as a form of labor. In the era of digitalization, this struggle was engaged on multiple fronts—with the "above the line" creative personnel on a project, with "below the line" craft workers in other departments, and with technicians using new tools, such as the DI.[15] This struggle plays out in a hierarchical, but collaborative system that declaims at every moment that such a struggle exists—the lines of authority are treated in trade discourse as non-problematically Fordist and predictable; understood as leading from the producer, through the director, to the department heads

[14] John Thornton Caldwell, *Production Culture*, (Durham: Duke University Press, 2008), 8-9.

[15] Conceptions of work in film production as "below" or "above" the line is an artifact from the era of the studio system, when "below-the-line" craft and technical workers were part of the fixed costs of the studio, and "above-the-line" talent such as writers, stars, and directors represented more variable costs. Although "the line" has blurred somewhat, this language and the division of labor (and credit) it signals has largely persisted in film and television production.

and so on.[16] In practice, though, a complex social process undergirds this dance that is, as Caldwell describes, both Fordist and post-Fordist in its reflexivity, cultural innovation, cosmopolitan orientation, heterogeneity, and eager grasp of the latest technologies.

Following Caldwell, I acknowledge that the distinction between *film* and *television* as industrial or narrative forms is blurred by the fact that most "below-the-line" workers migrate across those media-boundaries. The International Association of Theatrical and Stage Employees (IATSE), the union that represents cinematographers, production designers, editors, and more technical trades, provides workers to both film and television, for example. This blurring is reflected in my informant interviews when they use words like "show," "picture," and "project." These are Hollywood craft worker's catch-all terms for feature films, television programs, or other kinds of production. The film/television distinction, although often naturalized by popular and academic criticism, has less to do with differences in craft competencies (a set is a set and must be dressed, the lighting instruments do not change much, etc.) than the make-up of craft workers' employment networks, budget limitations, and rather narrow particularities about the eventual distribution outlet for the show (e.g., should a camera operator "frame," or compose, the shot for cinema or television?[17]). One of the key disruptions of digitalization was the proliferation of distribution outlets and the types of shows that became part of the work of professional craft workers. "I work in features" or "I work in television" became even less meaningful as a statement of professional positioning,

[16] Caldwell, 34.

[17] Since the widespread adoption of the 16:9 aspect ratio (i.e., frame dimensions) in digital television and computer monitors, this distinction has blurred even more. Most movies were (and are) shot with wider aspect ratios that 16:9. The 16:9 aspect ratio originated in a SMPTE working group in 1984 as a compromise aspect ratio for high definition (HD) video, based on common ratios used in cinema, American and European television. HD cameras, which would later become part of digital cinema production, were designed based on this aspect ratio. It was adopted by a European Commission on Advanced Television Services in 1993 to facilitate the E.U. transition to digital television and adopted by the FCC in the U.S. in 1996.

prestige, and expertise. Put another way, cinematography was no longer synonymous with film as a medium and digitalization allowed an incursion of new or previously unknown (often "unworthy") *workflows* into the craft practice of cinematography.

Workflow has become an increasingly important discursive resource for cinematographers as the production process based on 35mm film (the technological foundation of the industry and of their craft authority) was replaced by complex, hybrid workflows of film, video, and digital media. As a concept and object of study, I think workflow offers a new way to link technologies, institutions, aesthetics, style, and craftwork in the study of production cultures—analogous to, but distinct from, mode of production. Provisionally, we can define workflow as an ordering of technologies, personnel, and recording media, aesthetic choices, constraints of time and money, and received knowledge of craft practices in a repeatable, describable procedure for media-making. One finding from my study was that the organizing terminologies of "workflow" have emerged powerfully within the media industries over the last ten years. Traditional modes of authority and production were destabilized, such that designing and controlling new workflows proved a useful strategy for cinematographers to describe their work and maintain authority. As a conceptual schema, the salience of workflow has grown as familiar 35mm processes have been eclipsed by digital media tools.

Through the 1980s and early 1990s, the media industries underwent series of mergers and buyouts that dramatically altered the global media landscape. The forces of digitalization, globalization, and U.S. media deregulation combined to enable the formation of the "Big Six" media conglomerates—News Corporation, Time Warner, Viacom, Disney, General Electric, and Sony. As Schatz has described, these firms take in over 85% of the revenue in the domestic film market, and supply over 80% of the

primetime television programming in the U.S.[18] They have vast holdings across the global media industries, including television and cable networks, publishing, music, new media, and theme parks, and each owns a film studio. Sony, which will figure large in the chapters to come, held the unique position of owning divisions engaged in filmed entertainment (Sony Pictures) and developing electronics for the consumer and professional marketplace (Sony Electronics), one of several "hardware-software" (i.e., devices and content) strategies the conglomerates undertook in the 1990s. To the extent that there is a production culture, as Caldwell has suggested, and "workflow" has emerged as a useful concept within it, they exist in a media landscape dominated by these global players and competitive dynamics. As Christopherson has shown, conglomeration has led to increasing insecurity in the media industry workforce, especially among craft-level workers. The sources of insecurity include an increased reliance on contingency labor, lower wages, worsening work conditions, de-professionalization, and internecine struggle between labor groups.[19] As department heads and well-established professionals, the cinematographers that are the subject of my study may have been somewhat sheltered from the more damaging winds of conglomeration. They are not immune from the endemic insecurity that comes along with freelance labor, though, and their encounter with digitalization should be viewed with this broader canvas in mind. The craft had an enormous, and growing, stake in maintaining its value and authority in a film and television industry becoming more streamlined, global, connected…and insecure for its workers. They were in a good position to demonstrate their value.

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[18] Thomas Schatz, "The Studio System in Conglomerate Hollywood," in *The Contemporary Hollywood Film Industry*, Paul McDonald and Janet Wasko, eds. (Malden, MA: Blackwell, 2008), 27. In 2011, Comcast purchased NBC-Universal from General Electric.

[19] Susan Christopherson, "Labor: The Effects of Media Concentration on the Film and Television Workforce," in *The Contemporary Hollywood Film Industry*, Paul McDonald and Janet Wasko, eds. (Malden, MA: Blackwell, 2008), 155-165.

DEFINING CINEMATOGRAPHY

What is the importance of cinematography to a film or television production? Cinematographers may be in an authoritative position in production culture, but what is cinematography? In his memoir *A Man with a Camera*, cinematographer Nestor Almendros described it enigmatically as, "almost everything and hardly anything." He writes that it can be work that is highly technical, or it can be very expressive, or both, or neither. Almendros accepts the primacy of the director in creative hierarchy of cinema, but sees the cinematographer as a facilitator: "First and foremost, he must never forget he is there to help the director…the director of photography must always intervene when the director's [lack of] technical knowledge does not allow him to express his artistic desires in material and practical terms."[20] This is a common sentiment about the craft: a cinematographer lives and works at the intersection of artistic intentions—his or hers, or other people's—and the *material* and *practical* means to achieve them.

At the most quotidian level, cinematography is the collection of technical and aesthetic practices and knowledge used to design and record moving images that are the raw material of cinema, television, advertising or other kinds of motion media. Like many roles in the production process, there is no professional credential for cinematographers. Anyone can call himself a cinematographer if he fills that functional role and is bestowed as such in the credits attached to a movie, television program, commercial or other project. Professionalism is extraordinarily important in the trade, though, as the responsibilities are significant and there are certain courtesies, ethics, and standards of behavior that are part and parcel of production culture.[21] The International Cinematographers Guild (ICG), or Local 600, a craft union under the IATSE umbrella,

[20] Nestor Almendros, *Man with a Camera* (New York: Farrar, Straus, Giroux, 1986), 4.
[21] Blain Brown, *Cinematography: Theory and Practice* (San Diego: Focal Press, 2002), xi.

has a more restrictive definition of cinematographer based on seniority and work hours, a limitation that strongly shapes the industrial definition of cinematographer, as the lion's share of Hollywood production occurs under the aegis of the ICG. The Guild, as it is known, has been a key institution for the constitution of cinematography as a craft since its inception in 1926. The American Society of Cinematographers (ASC), a fraternal organization, began in 1919 and has perhaps the most restrictive definition of all, being an organization open by invitation only and thus projecting the strongest sense of cinematography as a coherent craft tradition. Although the Guild provides the crucial interface with the motion picture industry, it is through the ASC's members and publications that this trade comes by its craft sensibility—of apprenticeship leading to mastery, of generational commitments and the value of the specific tacit, embodied knowledge of cinematography. If craft is a culture, the ASC helps enculturate the professed values of this vision of cinematography, as expressed in the ASC motto: *Artistry, Loyalty, Progress*.

Cinematography, especially as conceived and practiced by members of the ASC, has earned its somewhat dubious reputation as a "fraternity," a society obscured by reticence and some well-earned suspicion of outsiders, with a sense of discretion that is almost tribal. It is a remarkably male-dominated trade; as of 2006, according to one study, only two percent of the top-grossing films produced in the United States were photographed by women.[22] Beyond the homosocial aspect, the trade's esoteric knowledge-base and master-apprentice structure lend themselves to an insular quality, as does the competitive landscape. Any single cinematographer has a rather tenuous hold on

[22] See Martha Lauzen, "The Celluloid Ceiling: Behind the Scenes Employment of Women in the Top 250 Films of 2006." *The Celluloid Ceiling* <http://moviesbywomen.com/statistics/2006CelluloidCeiling.pdf> (Retrieved June 6, 2011) and K.D. Shirkani, "Serving in Silence: Many Talented DPs Not Serving in ASC's Ranks," *Variety*, March 6, 1998, A2. According to *Variety* female membership of the International Cinematographers' Guild was 4% in 1998. In 2011, there were 330 active members of the ASC, of whom six are women. (ASC Roster, http://www.theasc.com, Retrieved June 6, 2011).

his or her job. As countless cinematographers have complained, workplace politics "can be brutal," and the cinematographer may be the first one fired when a movie is perceived to be in trouble, behind schedule, or aesthetically unappealing.[23] Cinematographers are the most authoritative of the "below-the-line" workers on a film set, often the most powerful creative voice working without the safety net of "above-the-line" contractual protections, which lends a certain fatalism to the trade. Yet, any cinematographer walks onto a set in a position of considerable creative and technical authority.

The prominence of the collaborative director-cinematographer relationship is one explanation for the cinematographer's prominent authority. This relationship can take many forms (see Chapter Two) but the variety of creative discussions to which a cinematographer may be party alongside the director—including pre-visualization conversations about shot design, choosing the capture medium, setting look and tone, assessing locations and shooting times, consulting on post-production processes, and ordering lighting instruments, among many others—reveals the cinematographer to be an influential contributor in most movie and television productions. Note that these decisions do not necessarily fall to cinematographers in every case, but they are expected to have opinions, if not ideas, to share on an enormous range of topics. The capture medium (film stock or video format) is only one component of their portfolio, of course, but one of such significance to other realms of decision-making, about shooting schedule, color, lighting budget, and so on, that their resistance to digital cinematography could not be dismissed as simple grousing from a tradesman asked to change his tools. Generally speaking, the cinematographers' authority in the division of labor far exceeded their

[23] Ellen Kuras, ICG Chat transcript, (Jun 23, 2001). Director Mike Figgis put it this way: "Cinematographers, whatever their nationality, if they are working in the American system, are far more insecure. DPs get fired. When the actress isn't looking good, for example. So, you see that look of panic on their face when the actress turns up for a role with bags under her eyes or whatever." Mike Figgis, interview by the author, November 29, 2004, transcript.

popular and critical visibility, which is one reason their sudden, quite vocal protests in the "death of film" debate around 2000 was so notable (see Chapter Six).

If there is any conception of cinematography that covers this sense of authority, it may be found in this popular formulation: the cinematographer is the *guardian of the image.* This phrase captures the twin imperatives of the craft rather neatly—a cinematographer is expected to design images that serve the narrative and aesthetic demands of her creative collaborators, primarily the director, and to guarantee the safe passage of those images, on the recording medium of choice, through the production process for investors and owners of the program. The cinematographer's design sensibility—of light and composition and color—and her facility with defining and maintaining a consistent "look" through this process is one of the indications of accomplishment, or mastery, in this craft culture. Overcoming the challenges of crafting novel and interesting looks and guiding them through to completion of a "show" are its signature accomplishment. When faced with a competing system of image capture—film, video, or digital—the central question for cinematographers was whether it enhanced, diminished, or even threatened their role as guardian of the image.

"Film" or "digital," in my approach, are not technologies in and of themselves. To some extent there are core technologies at issue, of course: an analog photochemical medium called film, an analog electronic medium called video, and a digital medium, the charged coupling device (CCD) computer chip and digital recording devices such as hard drives. These offer three different means to capture and store moving images. It is not my goal to relate the histories of these rival media—film stretching back over one hundred years, video sixty years or so, and digital forty years or less (depending on how you choose to define it). Rather, I want to emphasis that by the late 1990s these terms—film, video, and digital—and then just film and digital (as video became subsumed under

digital and effaced from the discussion) are best seen as the discursive faces of two technological *systems*—representations of distinct bodies of knowledge and practice with different histories, networks of actors and institutions, and various interpretations about their meanings and capacities as a motion picture medium.[24]

Research that centers on a social and technological change often risks charges of technological determinism. However, as Latour and others have argued in actor-network theory, technologies cannot be ignored as carriers of the knowledge and intentions of people and institutions.[25] To the extent that a technology acts a delegate for certain kinds of agency, we might think of technologies as a kind of "non-human actor," to use Latour's provocative construction. When joined with humans in complex networks of discourse and practice ("hybrid networks," is Latour's phrase), this peculiar "agency" of technologies can be quite profound. I would suggest that film-based technologies and their usurpation by "digital" technologies enacted precisely this form of struggle over production and meaning between two powerful systemic agencies. The affordances of digital as against 35mm film raised craft-specific questions: what is a telecine and who decides? What is a production camera? What is "quality" color and resolution? What image resolution accurately translates film into digital? The interpretations of the systems—what made "film" useful for making movies, as opposed to what made "digital" useful for making movies—would come into conflict, and craft was an important ground on which the struggle was enacted. What was cinematography as a craft? As an art? Where were the boundaries? Could they expand? Would it splinter into sub-specialties or be absorbed into other, or new, craft traditions? Could it retain its

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[24] Weibe Bijker, Thomas Hughes, and Trevor Pinch, eds. *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge: MIT, 1987), and Thomas Hughes, *Networks of Power: The Electrification of Western Society, 1880-1930* (Baltimore: Johns Hopkins University Press, 1983).

[25] Bruno Latour, *We Have Never Been Modern*, Trans. C. Porter. (Cambridge: Harvard University Press, 1993), 23.

conception of cinematography as a unity, that is, as defensible territory in the collaborative process of filmmaking?

LABOR, CRAFT, AND PROFESSION IN CREATIVE INDUSTRIES

Until recently, there have been few systematic studies of workers in what has variously been termed the mass media, the cultural industries, or creative industries. Sociologists undertook several studies of movie industry workers in the 1950s and 1960s, at the height of Parsonian sociology. Most of these studies either accepted the received wisdom of director or producer as primarily responsible for movies, or concentrated on the supposed deleterious and debasing effects of the movies themselves.[26] Occupational studies appeared in the late 1960s and 1970s, examining artists' relationship to culture-producing organizations. Faulkner, for instance, studied studio musicians' working conditions as creative workers within a highly organized and technical production organization of the movie studio.[27]

These theories of creative work largely treated workers as contributing ideas or expertise as an input to commercial systems. Richard A. Peterson challenged the linearity of this model with his study *Creating Country Music*, arguing that a wide array of specialists encounter the cultural product on its way to market, each applying his or her own creative labor to the final product, shaped significantly by shared, if loosely-configured, conceptions of product categories, such as "country music."[28]

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[26] See Leo Rosten, *Hollywood: The Movie Colony*, (New York, Harcourt, 1941); Hortense Powdermaker, *Hollywood: The Dream Factory* (Boston, Little, Brown, and Company, 1950)

[27] See Robert Faulkner, *Hollywood Studio Musicians: Their Work and Careers in the Recording Industry*. (Chicago, Aldine Atherton, 1973), also Harold Becker. *Art Worlds* (New York, Free Press, 1963) and Paul M. Hirsch, "Processing Fads and Fashions: an Organization-Set Analysis of Cultural Industry Systems" in *On Record: Rock, Pop and the Written Word*, Simon Frith and Andrew Goodwin. New York, Pantheon 1990).

[28] Richard Peterson, *Creating Country Music* (Chicago, University of Chicago Press, 1976).

Du Gay, Negus and others applied cultural studies concepts to this theory of the "production of culture," proposing a "cultural economy" model that encompasses the domains of identity, representation, consumption, and regulation. As applied to the study of occupations, their "production of culture/cultures of production" approach calls for research into "assemblages of meaningful practices that construct certain ways people conceive of and conduct themselves at work."[29] Scholars using this approach have been notably reluctant to propose any overarching system or taxonomy to describe the division of labor within cultural economy, but the position of "cultural intermediaries," such as advertisers, designers, and marketers, has been prominent in this research. David Hesmondhalgh proposed a specific, four-part division of labor: *Owners and executives* can hire and fire personnel but have a limited role in the conception of particular texts. *Primary creative* personnel are the symbol creators such as musicians, directors, journalists, or authors. *Technical craft* workers make creative decisions in the course of performing a limited range of tasks, but have no role in conceiving the texts they help produce. Finally, *creative managers* are workers such as agents, editors, or producers that mediate between creative personnel and the owners and executives.[30] Other contemporary research has examined the structure and style of communication among creative workers in the movie trades, or considered the role of marketers and license agents in shaping the products of the industry.[31]

These taxonomies have given us more tools to think about the cultural intermediary as a producer or manager of culture.[32], More recently, Hesmondhalgh and

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[29] Paul du Gay, "Introduction." in *Production of Culture/Cultures of Production* (London: Sage, 1997), 4.
[30] David Hesmondhalgh, *The Cultural Industries* (London: Sage, 2002), 56.
[31] See Caldwell, *Production Culture*; also Elana Levine, "Toward a Paradigm for Media Production Research: Behind the Scenes at General Hospital." *Critical Studies in Media Communication* 18:1, 2001, 66-82, and Avi Santo, "Batman versus The Green Hornet: The Merchandisable TV Text and the Paradox of Licensing in the Classical Network Era." *Cinema Journal*. 49:2 (2010).
[32] This branch of the debate originated around a quote from Pierre Bourdieu's *Distinction*:

Baker have focused on the nature of technical craft work in the cultural industries, defining it as work that enjoys some degree of creative autonomy in the production of culture, although in admittedly constrained ways. This creative autonomy has both positive and negative aspects, including possibilities for greater prestige, self-esteem, and self-realization through work but also a tendency toward overinvestment of the self in professional identity, vulnerability to "self-exploitation," income insecurity, and outright abusive working conditions, among other problems.[33] They conceive of creative autonomy as involving two variants: aesthetic autonomy and professional autonomy.[34] They describe the former as a contradictory and ambivalent process by which the human aspiration to partake in culture and communication, to engage morally and intellectually in one's work, co-exists with the problematics of market logic and the exercise of power in the social field. The professional variant is linked to the institutionalization of professions as they seek forms of autonomy based on credentialing, norms, and other kinds of group surveillance. Again they highlight the ambivalence of this process, as the "enclosure" of professionalism contains both elitist, anti-democratic aspects, but also "professional values may help to provide some resistance to the encroachment of commercial goals."[35]

> The new petite bourgeoisie comes into its own in all the occupations involving presentation and representation (sales, marketing, advertising, public relations, fashion, decoration, and so forth) and in all the institutions providing symbolic goods and services. (1984, 359)

Bourdieu's termed this new class of workers *cultural intermediaries.* The term has been used to talk about music producers (Negus 1992) or advertisers (Nixon 1997), indicating classes of workers engaged in cultural production. David Hesmondhalgh has argued that these authors have applied the idea of "cultural intermediary" too generally (2002). He writes that Bourdieu seems to restrict the cultural intermediary role to that of critics, journalists, and producers of "cultural" programming on radio and television—that is, interpreters of dominant culture. To Bourdieu, these occupations form the core of a significant new social class, a petite bourgeoisie charged with mediating between producers and consumers of the new forms of mass media.

[33] See David Hesmondhalgh and Sarah Baker, "The Specificity of Creative Labour" *Creative Labour: Media Work in Three Industries* (New York: Routledge, 2011), 52-78.

[34] Ibid., 61.

[35] Ibid, 67.

I will return to the concept of "creative autonomy" below, and contrast with my use of the term "authority." As a general outline, though, I conceive of the work of cinematographers in terms similar to Hesmondhalgh and Baker (as I would production designers, composers, special effects supervisors, editors, and others); this is a category of worker that does not own the means of production nor the intellectual properties that drive the cultural economy, but still wields significant authority in the conception and execution of the elements that make up cultural texts. These individuals are typically charged with making aesthetic and technological choices that greatly determine the content of entertainment programs. They can command high salaries and are sometimes represented by agents as any other valued "artist" in the culture industries. The privileges they enjoy (and actively protect) indicate the real and perceived authority of creative talent in the ecology of the entertainment industries.

TECHNOLOGY, LABOR AND AUTHORITY

There is a related set of questions to be asked about the relationship between craft workers and technological development. The progression of "digital cinema" over the last twenty years may seem a relatively smooth process of vendor research and development, industrial integration, employee education and training, and so on, as these new technologies diffuse into an increasingly "digital" entertainment industry.[36] Indeed, the seemingly relentless procession of new digital technologies would seem to conform to the rational models of technological development such as path dependence theory or of technological adoption patterns such as diffusion theory.[37] Without re-legislating these

[36] This is certainly the impression provided by major cinema-tech manufacturers and their R&D press releases, the small bookshelf of titles released in the last decade about the emergent digital cinema, such as Kirsner's *Inventing the Movies* (2008) and McKernan's *Digital Cinema: The Revolution in Cinematography, Postproduction, and Distribution* (2005), and indeed much of the trade press I reviewed in my research. That "narrative of inevitability," as I will call it below, was a thorn in the side of cinematographers.

[37] Everett Rogers, *Diffusion of Innovations*, 4th ed. (New York: Free Press, 1962).

theories of technological change, I argue that a more grounded look at technological development reveals a conflictual process of negotiation and exchange between agents in complex cultural systems. Understanding such struggles requires a definition of technology as more than machine or technique divorced from social context, but rather constitutive of, if not the product of, social processes and negotiations.

Research on the historical relationship of technology to labor has been a useful addition to the diffusion model of technological change, illustrating the significance of labor and work processes in guiding innovation. The complex, often antagonistic relationship between workers and new technologies has been a theme of this research since the artisans in the seventeenth century first began burning down the machines that threatened their livelihoods, leading to the Luddite movement in the early nineteenth century.[38] The transition of artisanal to factory labor through the late nineteenth century was an uneven and highly conflicted process, bound up in ethnic and gender divisions and complicated by types of labor that were not easily automated.[39] With the emergence of highly elaborated work-process and time-motion analyses of industrialists like Frederick Taylor after 1900, the relationship of machines to workers turned toward extreme rationalization, although, as many have argued, Taylor was never as successful in his efforts to "mechanize" labor as his reputation would suggest.[40] The theme of rationalization persists in generations of historians and sociologists, whether in tracing the modern "degradation" of work into unskilled, skilled, and managerial functions[41] or, in the age of the computer, the relentless effort to "encode" knowledge and reduce skilled

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[38] See Binfield's introduction to his *Writings of the Luddites* (Baltimore: Johns Hopkins University Press, 2004).
[39] Bruce Laurie, *Artisans into Workers: Labor in 19th Century America* (New York: Noonday Press, 1989).
[40] See Hugh G. J. Aitken, *Taylorism at Watertown Arsenal: Scientific Management in Action, 1908-1915* (Cambridge: Harvard University Press, 1960).
[41] Harry Braverman, *Labor and Monopoly Capital*: *The Degradation of Work in the Twentieth Century* (New York: Monthly Review Press, 1974).

work to its most repetitive and mundane aspect for automation using information processing.[42]

These pressures and antagonisms are present in the process of transforming cinema from a photochemical to a digital medium. However, the industrial forms at the center of my study, the creative or media industries, have encountered that same struggles Laurie describes in nineteenth century artisanal culture: with each new technology they faced what Zuboff has called the "paradox of the skilled body." The felt knowledge of materials, procedures, and aesthetic judgment create durable modes of practice that are not easily displaced.[43] Cinematographers, as well as many other workers in these industries, are "skilled bodies" in Zuboff's sense, workers whose forms of knowledge are robust and difficult to automate.

This does not put them outside the scope of these writers' arguments for the essential antagonism of labor and technology. Indeed, the skilled worker, Zuboff argues, becomes the locus for a kind of disciplining that is essential to the success of an industrial form; the body must be carefully "honed" into an instrument of production. Film and television production is a highly elaborated, mature industry with well-established labor processes, workflows, and economic regimes—the discipline of professional success is a well-established, if elusive, quantity. As a sector that has pursued globalization and consolidation strategies for decades, many of the shifts in work and production processes that many analysts noted in the last quarter-century are present in the film and television industries going back to the 1950s. Arguably, they are progenitors of what Castells called the "network enterprise"—industries focused on mass customization, flexible specialization, asymmetrical geographies of labor and production, mobility of labor,

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[42] See Shoshana Zuboff, *In the Age of the Smart Machine: The Future of Work and Power* (New York, Basic Books, 1988) and James Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society* (Harvard University Press, Cambridge, 1986), 8.
[43] Zuboff, 36.

"informationalism," and a tacit acceptance of a degree of "creative destruction" as an unavoidable part of life and labor. Many of the emergent aspects of this "network" division of labor can be found in the craft traditions of the media industries as well as, crucially for my argument, an intensified awareness on the part of each worker of the significance of becoming a value-making, relationship-making, and decision-making part of the industrial order.[44] Each worker has a large stake in remaining relevant in the destruction process of "innovation." The disciplining of aesthetic and technical work within the industrial framework of film and television production is a component of what I call craft culture, but these processes are not totalizing. To continue, the processes rely on the agency of cinematographers, on their performances of mastery and transmissions of cultural knowledge.

The struggle over authority in this system historically has come to bear on questions of decision-making and the ability for workers to exercise forms of agency, as I have said, to make decisions that "stick." Authority in these settings is mobile; it derives from many different and unexpected sources: convention, institution, culture, contract (law), technical standards and "best practices" discourse. The threat presented by technologies and changes in technique is often first perceived by workers when a decision-making "moment" starts moving around within the work process. In my interviews this was expressed when cinematographers talked about the point when their aesthetic choices got "baked in" or "locked in" to a project, the moment when the cost of making a change—in time or money—became prohibitive. The authority of cinematography has had much to do with the ability to conceptualize (technologically and aesthetically) particular looks, realize those looks, and protect them through the complexities and conflicts of the production process. Thus, the affordance in digital

[44] Manuel Castells, *The Rise of the Network Society* (Cambridge, MA, Blackwell, 1996).

media to delay or reverse such decisions was perceived as an enormous threat to their craft.

Craft authority derives from community as well—in some senses an imagined community, but one realized in material ways, in the processes of labor, relational networks and mentorship, built environments, written manuals, contracts, and so on.[45] Campbell draws on similar logics when he describes scientific disciplines as "tribal" in their almost inchoate dependence on charisma, leadership, and influence in the maintenance of "self-perpetuating belief communities." Within such "tribes," scientific verities that have been thrown into question, or even discredited, may persist for a surprisingly long time based on generational loyalties and the textual basis on which people build their own expertise.[46] Battles over new theories and explanations are waged on the grounds of culture, loyalty, and tradition as well as scientific evidence. I think of craft knowledge in similar terms.

Much of the work on production cultures and cultural ecology focuses on that paradoxical space where workers are charged with responding to the logics of industry and commerce while navigating in the crosscurrents of culture, taste, and art. I think there is a tension is this sort of labor, a pressure derived from the process of making cultural objects that Hannah Arendt has characterized as melding "the amoral absorption in a task" with the moral process of "discussing and judging."[47] For Arendt these were incompatible practices, separated by the gulf between speech and action, and one of the features of modernity, she argued, was the continuous effort to separate the two domains. Zuboff and Braverman trod similar ground in their distinction between the managerial,

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[45] See Benedict Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (London: Verso, 1983).
[46] Donald Campbell, "A Tribal Model of the Social System Vehicle Carrying Scientific Knowledge." In *Methodology and Epistemology in the Social Sciences*. E. Samuel Overman, Ed. (Chicago: University of Chicago Press, 1988), 499.
[47] Hannah Arendt, *The Human Condition* (Univ of Chicago Press, Chicago, 1998).

skilled, and unskilled functions in modern labor. Sennett has criticized this as a false distinction, arguing that the process of "making" persists in many forms of work and is always one of both feeling and thinking.[48]

As labor in advanced societies become inextricable from technological form, the relationships between task and judgment, between doing and creating, become more pressing, and, at moments of technological change, the very definitions of work, of authority, and collaboration within established systems are brought into question. I see cinematographers as "makers" in Sennett's sense, deeply invested in both performing and judging their work and that of others, but also grappling with that tension described persuasively by Arendt and Braverman as splitting the managerial functions from that of the skilled or unskilled. In my study, "making," as an intersection of production practice, technology, and style is a synonym for what I will call craft. Craft workers must negotiate directly the limits of physical objects (their tools and media) and the limits of discourse (what can be said and understood) to produce an art object-cum-industrial product by which their work will be judged. There are limits, as we will see, some self-imposed and others imposed on them.

Occupation has long been recognized as contributing to the construction of certain "attitudes" or ideologies in its practitioners. In *Craft and Consciousness*, Bensman and Lilienfield argued that "major 'habits of mind,' approaches to the world…attitudes toward everyday life, and specialized attitudes are extensions of habits of thought that emerge and developed in the practice of an occupation, profession, or craft."[49] I am not interested in speculating on the internal orientations, or ideologies, held by craft identities taken as a whole, but like these authors I want to use craft as an alternative to the

[48] Richard Sennett. *The Craftsman*. (New Haven: Yale University Press,2008)
[49] Bensman and Lillienfield, xv.

tendency to emphasize class or profession in what is essentially a study of a culture of work. Craft, although more diffuse as an institutional locus of work practice than occupation or profession, is nonetheless a site on which culture develops, with patterns of taste and value, secondary and supporting institutions, and types of knowledge transmitted in distinctive ways.

I see Caldwell's approach to production culture as synthesizing many of these insights on technology, labor, and authority. He argues that a powerful and constant stream of reflexive discourse or "critical industrial self disclosure" is a defining feature of the contemporary film and television industries. Production cultures are constituted by these complex exchanges of information, status, story-telling, and technical detail that are part and parcel of the crafts, and increasingly an important part of the promotional apparatus of the media industries.[50] My argument here is based on a further claim: Any particular craft, while largely constituted within industry, extends beyond the boundaries of particular formations such as "media," "film," or "television" to form a coherent, historically grounded community of practice and knowledge, quite literally its own *culture*—with languages, subcultures, mechanisms of communication and status, of aesthetic value, and boundary policing.

TECHNOLOGY AND FILM STYLE

If understanding technology is one unavoidable aspect of this craft culture, understanding film style in relation to technology is another. Bazin provided one of the earliest attempts to understand film style's relationship to technology. Cinema, to Bazin, was an art form composed of its own unique grammar and techniques, such as deep focus and wide screen composition. The tools of cinema were important, but only to a point. Deep focus was especially interesting to Bazin because this stylistic technique—holding

[50] Caldwell, *Production Culture*, 316-317.

in focus objects both near and far from the camera—seemed independent of technology. The desire to use this effect had persisted through decades of filmmaking and many techniques had been used over the years to achieve it. Thus, in Bazin's words, "since the determining technical factors were practically eliminated, we must look elsewhere for the signs and principles of the evolution of film language, that is to say by challenging the subject matter and as a consequence the styles necessary for its expression."[51] That is, it is not enough to look to the technological (and economic) base to explain change in cinema. Bazin sees technologies as an environmental factor, an input to the "evolution of film language."

However, Bazin attributed little responsibility for this evolution to craft workers. A stylistic choice like deep focus was not "stock in trade" for the cameraman but a "capital gain in the field of direction…a dialectical step forward in the history of film language."[52] In other words, new technologies only require the director to ask technicians to achieve this or that vital effect in new ways. Bazin leads one to imagine a running battle that matches the forces of economy and technology to that of certain brave, eloquent directors, fighting an isolated rear-guard action in protection of "real" cinema. Yet it does seem to paint an incomplete picture if craftwork is bracketed off from creating (and protecting) filmic language, as Bazin does. After all, these workers historically have mediated the capabilities of the necessary equipment and the aesthetic conventions of the medium, even if "only" by virtue of their place in the division of labor. Certainly, although cinematographers accept the institutional basis for a director's authority, as a creative partnership they perceive it in more equal terms, as Brown, describes it, a *symbiosis*:

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[51] Andre Bazin, "The Evolution of the Language of Cinema," from *What is Cinema?* (Berkeley, University of California Press, 1967), 30.
[52] Ibid., 35.

> To a great extent the knowledge base of the cinematographer overlaps with the knowledge base of the director…the DP has some duties that are entirely technical, and the director has responsibilities with the script and the actors, but in between those two extremes they are both involved in the same task: storytelling with the camera—this is what makes the creative collaboration between them so important.[53]

In this reading of the craft, cinematographers and director manage different, equally important aspects of the production process.

Directors as exemplars of individual style became a dominant thread in film history and criticism after 1960. This "auteur" theory originally emerged from Bazin's *Cahier du Cinema* magazine, was later championed by leading French critics such as Francois Truffaut and Jean-Luc Godard, and then carried into the American academy by Andrew Sarris. This theory clearly provides little room for speaking about authority by workers such as cinematographers, and has even less to say about the role of technology within that authority.

By the 1970s, theoretical studies of film were critiquing the Auteurist treatment of the "apparatus" of cinema as too sanguine, assuming that the technological base of cinema was outside politics and the movie camera simply a fortuitous merging of human physiology, scientific discovery, and entrepreneurial exploitation. Scholars in the "apparatus school" directed their attention instead to the camera's role as a signifying machine. Unlike many systems of technology, they noted, cinema works directly through representation, and is thus directly implicated with the reproduction of ideologies (Heath 1980). Moreover, as Comolli argued, ideology operates throughout the filmmaking process, from the "visible" aspect of technologies, practices, and people, to the "invisible" aspects of chemistry, frame lines, lab work, editing, sound, and so on. "Neither in the production of film nor in the history of the invention of the cinema is the

[53] Brown, ix.

camera alone at issue." Comolli writes, "If the way that it involves technique, science, and/or ideology is in fact determining, it is only so in relation to other determining factors…the status and function of *all that the camera conceals*" (italics mine).[54]

For Comolli and others in the Apparatus School, the movie camera necessarily embodies the realist perspective of art dating back to the Renaissance, transmitting an individualistic humanism that neatly supports prevailing Western (i.e., capitalist) economic power structures. The economic motive, as the engine of the development of cinema's entire technological toolkit, reveals the cinema's latent ideological content and provides the backdrop for all subsequent development. Comolli quotes Deslandes: "The essential fact and starting point of the process which finally led to the practical realization of animated projections was the nickel which the American viewer dropped into the slot of the Edison Kinetoscope.…"[55]

While the search for nickels dropped into slots must doubtless be accepted and accounted for as an explanation for the history and development of cinematic technology, my goal is somewhat different. This system did not spring whole from the mind of any inventor, but emerged slowly from the collective successes, failures, and experiments of thousands of enterprising people, their backstage procedures, technologies, and ad hoc solutions. Comolli's "social machine" of cinema was a cold, rent-seeking apparatus; my examination of the process of technological change in the media industries attempts to account for the real human eyes the apparatus school largely ignored: the human eye pressed firmly (if sometimes metaphorically) to the camera viewfinder and motivated by a wealth of factors, not least of which was the definition and protection of craft identity itself.

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[54] Jean-Louis Comolli, "Machines of the Visible," *The Cinematic Apparatus*. Theresa De Lauretis and Stephen Heath, ed. (New York: St Martin's Press, 1980), 125.
[55] Jean-Louis Comolli, "Technique and Ideology: Camera, Perspective, Depth of Field," in *Narrative, Apparatus, Ideology*,Philip Rosen, ed. (New York: Columbia University Press, 1986), 55.

If technology and film style are not the product of individual invention, then, could they be attributed to larger institutional frameworks? As Bordwell, Staiger, and Thompson demonstrated, the invention of a Hollywood "group style" in cinema's pre-institutional era (roughly 1907-1930) proved enormously profitable and influenced much of the subsequent aesthetic, narrative, and technological development.[56] Staiger has described cinematography as a profession produced by this process, a move from the "social division of labor" that structured cinema's early period (e.g., the director-cameraman of the primitive period) to the "detailed sub-division of labor" that characterizes the mature film industry. Like the branches of a tree, cinema's early work roles divided and subdivided through the 1920s (e.g., the role of director-cameraman dividing into director, lighting cameraman, camera operator, assistants, loaders, continuity clerk, and so on) in accord with the demand for more efficient production with exacting standards of "quality."[57] Craftwork, or the melding of technical and creative work to form specialized divisions of labor, was a by-product of Hollywood's demand for efficient modes of production (standardization) and new stories, new looks, new techniques and novelties (differentiation).

There is a deterministic cast to the "group style" argument that a closer examination of craftwork may complicate in at least two ways. First, there is a circularity that seems inherent in the core argument: if the mode of production is created to realize and enforce the group style, how can it also be an effect of that group style? The relationship is presumably dialectical, but these arguments always threaten to become tautological: where does this process begin and end? How does change occur? Craft and craftworkers, I suggest, if not a source of change, do work as important mediators,

[56] Bordwell, et al., *Classical Hollywood Cinema*, 3.
[57] Ibid., 142.

resisting radical change while also pushing against convention in the process of seeking new expressive and inventive forms. Creativity in the face of convention is where cinematographers find reputation and recognition. Second, it is claimed that a detailed divisions of labor always seeks to separate labor into two classes: those who conceive the work versus those who execute the work. As I conceded earlier, this theory of labor, within limits, can explain a great deal about work processes and technological change. However, along with du Gay and other theorists of production culture, in this study I will argue that there exist classes of workers engaged in the production of expressive culture *whose positions place them at the intersection of detailed and social divisions of labor* and thus in positions of rather interesting and disproportionate power (from the point of view of a purely critical explanation) to support, deny, or shape the technological and aesthetic future of the form.

Bordwell acknowledges this possibility when he writes: "Filmmaking mass production never reached the assembly line degree of rigidity that it did in other industries. Rather it remained a manufacturing division of labor with craftsmen collectively and serially producing a commodity." Nonetheless, in the broader argument, the authority of "craftsmen," to advance, delay, or shape the technological base of the cinema, is treated as univocal: when faced with variable possible solutions and techniques, one gets the impression that they fell in line en masse in accord with standardized and interchangeable methods decreed by the classical system.

Hollywood's classical style remains a crucial resource for my understanding of the factory system that developed in the mid-1900s, allowing studios to "manufacture" films of consistent quality and profitability.[58] Still, despite its complexity, the classical style argument threatens to reduce craft workers to little more than functionaries in the

[58] Ibid., 87.

powerful system of studio production. Schatz has similarly described how style came to be further inflected through individual studios' resources. Personnel and assets within studio influenced of the expression of style in particular ways. "In each case," Schatz writes, "the 'style' of a writer, director, star—or even a cinematographer, art director, or costume designer—fused with the studio's production operations and management structure, its resources and talent pool, its narrative traditions and market strategy."[59] In this rendering, technology and style are more the product of negotiation, an approach also applied by other historians. Carringer, for instance, has argued that Orson Welles' experiments with deep focus cinematography owe at least as much to cinematographer Gregg Toland as Welles' himself.[60] Ogle has attributed Toland and Welles' use of deep focus to the popularity of pictorial and fashion magazine photography in the 1930s and a range of technological developments, chief among which were new kinds of lighting instruments, film stocks, and camera blimps, as well as a breakthrough in lens coating that significantly enhanced the ability of lens to pass light to the film stock.[61] Keating paints a portrait of cinematographers at the birth and apex of the studio era (1920-1950) as engaged in a constant balancing act, mediating conflicts and contradictions within classical style, developing multifunctional lighting solutions and conventions that then become the foundation of cinematography as a craft.[62]

Historical studies such as those I cite above have the benefit of temporal distance to make certain causal arguments. At one time, the film industry did resemble a factory system, and particular factories did produce their own signature styles. Welles did rely on

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[59] Thomas Schatz, *The Genius of the System: Hollywood Filmmaking in the Studio Era*. (New York: Metropolitan, 1988), 6.
[60] Robert Carringer, *The Making of Citizen Kane* (Berkeley: University of California Press, 1985).
[61] Patrick Ogle, "Technological and Aestethic influences on the Development of Deep Focus Cinematography in the United States" *Movies and Methods, Volume 2*. B. Nichols, ed. (Berkeley, University of California Press, 1976).
[62] Patrick Keating, *Hollywood Lighting from the Silent Era to Film Noir* (New York, Columbia University Press, 2010), 192.

Toland, who also relied on an extremely cohesive culture of cinematography under contract to the studios. And other media, such as fashion photography and newsreel journalism, inspired cinematographers as well. All of these studies describe a range of workers (including labor associations, professional associations, commercial vendors, and producers) inventing or adopting production techniques through a complex process of negotiation and debate over the best way to balance stylistic choices with efficient production. My study makes an implicit argument for a more robust historiography of film craft. What role did craft workers play in the formation of styles, how does that role complicate the received histories of auteurist, classical or studio authority? I would argue that even as they experienced uncertainty within their own craft cultures, and instability as a class of laborer, craft workers exercised considerable influence in the process of integrating, building, and rejecting technological and stylistic change.

One of the interesting aspects of cinematographers' authority was its position between the institutions that researched, developed, and merchandised digital imaging devices (such as Sony, Kodak, Thomson, and Texas Instruments), and the studios and producers that make the movies to sell (the "big six" media conglomerates, which includes Sony). Seeing the cinematographer as betwixt these powerful sites of technical and creative authority is crucial to understanding their influence (and the limits of it) in the technological and stylistic history of cinema. Manufacturers and media corporations alike were, to some extent, dependent upon the imprimatur of professional cinematography for their digital media strategies. The move to digital production represented a turning point for cinematography in as much as it has changed the specialized knowledge that defined the profession, but there was a related process by which the process of high-quality image capture was demystified and made more accessible. Consumer and pro-sumer digital video cameras have been important drivers

for manufacturers' research and development efforts and omnipresent in moviemakers' marketing and fundraising rhetoric, in which digital cinema is cast the latest technological "revolution" to "democratize" movie making. Electronics manufacturers have increasingly seen cinematographers as a key constituency for digital cinema, but their strategic cultivation of this relationship has to be seen in relation to the development of digital media devices for the mass market. Thus, wider processes of digitalization, the splintering of the mass audience, the mobility of labor and outsourcing, migrations of workers and cultural form, are all part of this story as well. Histories of amateur image creation and circulation, such as *Mining the Home Movie: Excavations into Historical and Cultural Memories* and *There's No Place Like Home Video* have opened up discussion of the significance of image-making in the wider social field and how those practices interface with mass and popular cultural forms.[63] My project centers on professional image makers, but to try and capture the complexity of this craft culture and its connections to these wider social and cultural discourses, the digitalization of cinema must be seen as the product of multiple streams of practice and discourse: consumption, production, the arts, sciences, engineering, and industry.

RESEARCH METHOD AND PROCEDURES

I drew upon a wide range of sources to trace this process: the words of interview subjects, observations of cinematographers at work, trade discourse, cinematic texts, and debates over technical standards. Using this array of sources, this study attempts a merger of SST's centering of technology—the CCD—and its varied deployments in motion picture production with analyses of key texts and the principles of their construction, to

[63] See Patricia Zimmerman and Karen Ishizuka, eds., *Mining the Home Movie: Excavations into Historical and Cultural Memories* (Berkeley: University of California Press, 2007) and James Moran, *There's No Place Like Home Video (Minneapolis: University of Minnesota Press, 2002).*

illuminate an aspect of production culture in transition.[67] Caldwell's notion of "critical industrial self disclosure" formed the basis of my analysis, along with his assertion that production culture is revealed through complicated exchanges of information, status, story-telling, and technical negotiation that are a part of the lived experience of work and profession, but also an important part of the promotional apparatus of the media industries. As I examined the trade discourse around digitalization and spoke to cinematographers about digital production tools, I realized that, to them, I was just another manifestation of this information exchange. I identified myself as a student—and I believed my youth and perceived "neutrality" opened many doors—but in some ways I was perceived and treated as a member of the press; my questions an opportunity to present (again) the case for cinematography: that it was important, that it was special and worthy of defense from what was seen as incursions by manufacturers or other craft areas on cinematography's traditional role. I was invited to demonstrations, screenings, film festivals, and film sets, but very much in the manner of a journalist—and there often were journalists at these events. In my interviews I often felt the need to steer conversations away from boilerplate pronouncements and back toward actual practice, perceptions, and areas of conflict that were important to my research question. Yet I was always aware that by entering this craft community at a time of uncertainty I was unavoidably becoming "part of the story," inextricably part of their anxieties and attempts to steer the discourse of digital cinema in their favor.

To some extent this problem was exacerbated by my primary community of informants. Most of my interviews were conducted with members of the ASC, including several founding members of the technology committee. To a great extent, my study was

[67] In this project I don't produce close readings of digital-originated movies that would lead to an argument for or against a poetics of digital cinema. However, my interviews were organized in relation to key movies and elicited informant's responses to digitally-created or revised projects that their peers have identified as significant or influential.

conducted within the bounds of the film and television in the Los Angeles basin, as was Caldwell's study. Being based in Austin, I observed some production in that city, and attended the 2004 CamerImage Film Festival in Lodz, Poland, a festival dedicated to celebrating global cinematography. For the most part, though, the historical geography of "Hollywood," as it exists in the popular imagination, was the locale of my research—my opportunities to attend presentations, screenings, and demonstrations often came through observations of cinematographers at work and in professional non-work settings like demonstrations in Los Angeles and at the ASC Clubhouse—a professional resource center and meeting space in Hollywood. In the process of conducting this research, several aspects of the communication style of cinematographers became clear. They are mobile workers—travel and extended absences from their "home" cities were part of the trade. They are guarded with their words and not prone to divulging details about their past employers to outsiders. They do not criticize the work of their colleagues as a matter of principle. They are adept as discussing and speculating about technological aspects of their work, but surprisingly tongue-tied about the affective or "artistic" qualities of cinematography, even as they insist that cinematography, at its best, is an art. An individual cinematographer, however, is unlikely to claim the mantle of art, as modesty has both cultural and commercial benefits in the system. When asked to comment on controversies within the craft, they are likely to repeat the lines and arguments from official organs like *American Cinematographer* (hereafter, *AC*), the magazine of the ASC. In this, cinematographers are much like their colleagues in other craft areas of the film industry and, indeed, many areas of work.[68]

[68] Bensman and Littlefield describe this as the "concealment of technique" and identify it as an aspect of an "artistic attitude" that attempts to construct art that is seen as "artless," not requiring knowledge of technique to understand. Joseph Bensman and Robert Lilienfield, *Craft and Consciousness: Occupational Technique and the Development of World Images* (New York, Aldine De Gruyter, 1991), 6; also see Caldwell on the tensions between "logics of collectivity" and "logics of autonomy" within production culture, *Production Culture*, 228.

These barriers to communication present certain difficulties for a researcher trying to construct a clear picture of a clearly transformative time in the history of a craft culture. Most of my informants were respected, decorated, highly visible members of the craft. They were "thought leaders" in some sense, writing and speaking to their fellows about these issues from positions of considerable craft authority, and they were profoundly invested in defining and describing cinematography to me as an indispensible, ineluctable element in professional media production. With very few exceptions, my informants expressed confidence that cinematography—in some form—would survive its encounter with digitalization. In what follows, I present a few of the key moments that this craft culture faced profound technological change. The most familiar story line of this period tells of cinematographers resisting change and protesting the "erosion" of their craft traditions—the infamous "film is dead" debate (see Chapter Six below)—but my telling will complicate that story to include people and projects that embraced change to varying degrees and, more importantly, negotiated new discourses and practices that tried to preserve a craft culture while adapting to and shaping emergent technologies. In doing so, I hope to demonstrate a method that takes craft culture seriously as a critical object and shows that different craft cultures can be treated as complex cultural formations, sociologically distinct yet deeply reflective of historical practices and shaped by received aesthetic values.

Much of the data of this study comes from 21 interviews I conducted with cinematographers, directors, and technologists between 2004 and 2006 (See Appendix One for a list of informants). My process of selecting informants was cumulative, but guided by reading popular criticism and the trade press to identify movies that had sparked discussion or debate. I also contacted David Heuring, a journalist and former editor of *AC* who has written extensively in the cinematography trade press since 1995. I

interviewed Heuring on what he believed were the key institutions and individuals shaping digital cinematography and interviewed as many as their busy schedules and my travel funding would allow. I also joined the professional forum *cinematography.com* and monitored chat rooms on digital cinema. I was fortunate that M. David Mullen, a frequent contributor to *cinematography.com*, came to Austin in fall, 2003, in order to shoot an HD movie for Burnt Orange Productions. Through informal conversations and one formal interview with him I added to my list of cinematographers with digital experience and confirmed that my earlier list fit his sense of the community of digital cinematography.

In the process of arranging and conducting these interviews, I attended three demonstrations of digital cameras (with screenings and Q&As) arranged specifically for cinematographers, conducted three visits to film sets using digital production methods, attended the CamerImage Festival, and attended Cinegear 2006, one of the leading technology trade shows in film production, including several days of panel discussions on topics of importance to craft workers in the industry. In professional settings and events like this I had many informal conversations with cinematographers, journalists, and technologists and those conversations should be seen as part of my process of exploring and getting to know this craft as a culture.

Research subjects were asked to participate in a semi-structured interview, typically conducted in informal locations such as their office or public spaces (See Appendix Three for the interview schedule). Interviews lasted anywhere from 60-90 minutes and were, in most cases, recorded and transcribed. The portion of this project using human subjects was approved by the Institutional Review Board.

I also relied heavily on sources such as the trade press' reporting on digital cinema between 1993-2005 (primarily *AC*, *ICG*, and *Variety*). Much of this material is important background about the state of the industry during this period, but also

cinematographers' statements from these sources (from interviews, published "production diaries," or signed editorials). Online communities such as *cinematography.com* and the ASC's web site now publish articles on cinematographic practice and I reference these as well. Finally, another source of cinematographers' own statements was biographies, autobiographies, and published interviews (in fact the presence of literally dozens of such works, considering the absence of cinematography from media studies, is an interesting topic in itself). Most of these works highlight older cinematographers (the "masters of light") and have little obvious relevance to digital cinema. I used these sources sparingly. Still, some elders do engage in discussions on technological change and to the extent that these cinematographers are members (if not guardians) of the craft culture of cinematography, these sorts of personal accounts proved helpful.

I also came to realize that cinematographers understand and almost always describe their work in the context of actual projects and specific technologies used to solve production problems. One of the most fruitful parts of my interviews turned out to be the sections that asked my informants to review a list of recent digitally-created movies and reflect on how and why they were significant. It then seemed important to include in this report some discussion of digital technologies in practice; what "digital cinema" meant to cinematographers in the concrete form of actual movies, the conventions of Hollywood's group style, and the craft of cinematography. Based on my research, I decided that a handful of movies should receive extended treatment and discussion. These include *Pleasantville* (1998), *O Brother Where Art Thou* (2000), *The Anniversary Party* (2000), *Star Wars: Attack of the Clones* (2002), *Personal Velocity* (2002) and *Collateral* (2004) along with, to lesser degree, other feature length movies and shorts, and miscellaneous examples. I viewed these seven films as examples of

digital cinema, doing shot-by-shot analysis of select scenes and, more importantly, frame analysis on shots that cinematographers and reviewers had cited as notable for their "digital" origination or manipulation. I do not think of these movies as defining "digital cinema" nor am I arguing that these titles deserve special critical attention for their significance within historical poetics, cultural politics, or other traditional critical categories. However, they are significant to this study because all were identified repeatedly by my subjects as important within craft discussions of the future of cinematography. Indeed, at least one of the short films I discuss (the StEM) was never intended for public consumption; it is essentially a calibration tool for digital projectors. This method blends critical industrial self-disclosure with contextual material provided by trade journalism and critical analysis of the visual qualities of craft texts in order to describe the complex historically-specific formation of labor, industry, creativity, art, technology that I have termed craft culture.

My analysis followed from this grounded, naturalistic approach. I identified themes, concepts, and ideas that had shaped cinematographers' relation to digital production. In grounded theory, observations should move from simple, discernable objects (persons, behaviors, settings, events, tools, techniques) toward more complex, ideational observations (concepts, beliefs, themes, practices, relationships).[69] In practice, this follows on the researchers' own growing familiarity with the research subject. In this study it led to descriptive accounts of cinematographic techniques, metaphors, spheres of influence, conflicted zones and the like, as well as typologies of practices, devices, and emerging techniques in digital cinematography. The primary insight this method gave me, I believe, was the sense among cinematographers that the digital transition started much earlier than I expected—in the mid-1990s—and did not begin with alternative

[69] Thomas Lindlof, *Qualititative Communication Research Methods* (Thousand Oaks, Sage, 1995), 166.

forms of image capture like high-definition video or digital video, but rather with the post-production processes of digital editing and the digital intermediate. From this insight I developed the eventual structure of the study, which moves from the aesthetic and historical context of cinematography into the three waves of digital change, and finally, the institutional reaction—by SMPTE, the ASC, and the major studios—to these changes.

STRUCTURE OF THE STUDY

The next two chapters provide an introduction to cinematography as a craft culture. Specifically they explore the craft's claims to aesthetic autonomy and its historical relationship to the motion picture industry—an industry that provided the ground on which the craft was founded, but from which it has pushed for a kind of independence as well. Digitalization forced cinematography to respond to shifts in the structures of authority that had long been defined by these media-specific distinctions, and the artistic conception of cinematography provided rhetorical and conceptual resources in that negotiation. Chapters Four through Seven introduce particular technologies that cinematographers encountered (digital intermediate, HD video, etc.), followed by the reaction of the craft to that technology, and then moves toward a consideration of movies that significantly shaping the discourse around it. Chapter Eight details the rise of d-Cinema and cinematographers' participation in developing standards and discourses around digital cinematography.

Chapter 2: Art and Cinematography

This chapter explores cinematographers' claims to artfulness, a claim made constantly, but in different ways, through the history of cinematography. Using interviews with working cinematographers and texts and manuals of the craft, I provide a close examination of the art-world of cinematography—its internal values and

hierarchies, its relationship to the history of art, schools of painting and photography, and other artful traditions.[70] Keating description of cinematographers' role in the development and maintenance of classical style from the 1920s through the 1940s provides an important backdrop here, especially as it highlights cinematographer's professional investment in various forms of "expressiveness."[71] The emergence of digital cinematography represented a threat to cinematographers' aesthetic imaginary on several levels, from the de-professionalization or demystification of media tools to the expanding frontier of "acceptable" quality cinematography in the formerly privileged stylistic spaces of movie theaters or prime-time television. The proliferation of permissible looks emerged from several quarters, many notably less expressive by the craft's earlier traditions, including amateurish photography in independent cinema, the anti-Hollywood manifestos like Dogme 95, new prominence of documentary and documentary-style photography, and mixing of mediums and looks in almost every domain of mass media. In exploring the rhetorical responses to those developments—which were not strictly "digital," but also not mainstream cinematography—I set the stage for how cinematographers' understanding of accomplishment, of "mastery," was able to accommodate the rise of digital cinematography.

Chapter 3: Cinematographers in Hollywood

This chapter traces the relationship of cinematography to the Hollywood mode of production, from the early Director Unit and Central Producer systems, through the coming of sound and Studio Era, the emergence of television, New Hollywood, to the present day. Using existing histories of cinema, trade press accounts, and other secondary sources, I show that cinematography has been remarkably resilient as a craft culture, from

[70] See Howard S. Becker, *Art Worlds* (New York, Free Press, 1982)
[71] Keating, *Hollywood Lighting*, 56.

the early manifestations as a "technical" position in the detailed subdivision of labor to its current, contested position in the age of digitalization. The durability of the craft owes much to publications like *AC* and the ASC's Cinematographer Manual, as well as continuous series of workshops and events by the Cinematographer's Guild and vendors, and a rich vein of autobiographies, memoirs, and manifestos published by working cinematographers. Cinematography is a craft that has aggressively promoted itself, writing (and re-writing) its history from the beginning. This historiographic tic may be due to the craft's master-apprentice structure in its early days and its relatively small and geographically-centralized population—both of which lent themselves to memorializing and documenting their experience—as well as not being part of the star-making and marketing apparatus of the industry, which heightened their sense that the craft was under-recognized as a contributor to the movie-making process. Through this self-historicizing, cinematographers describe themselves as struggling with a pendulum-like process that is familiar to any craft worker: their profession moves away from the mundane problems of simply capturing images, toward using photographic technologies to more "artistic" expressive ends, until it encounters new technological challenges and swings back toward technical assimilation. They perform this work within networks of authority and collaboration, with complex structures both "above" and "below" them in the hierarchies of institutional power, but in every era grasping onto a prominent place in establishing and mediating the relationship of technology and style in the process of making media. This context is important for establishing both the historical durability (and flexibility) of cinematography as a craft culture, but also for understanding the interesting role of generational change within craft communities.

Chapters 4 and 5: Cinematographers and the Digital Intermediate

As briefly described above, the DI complicated previously established boundaries of authority by merging aspects of cinematography with post-production laboratory work. Historically, film lab personnel had relatively few tools to manipulate film images and those tools (such as printer lights) were seen as part of the cinematographers' tool set; certainly the lab staff worked under close supervision of the cinematographer. In the new regime of DI, though, a new role emerged, that of the "colorist." A colorist could, at the request of a director or producer, radically shift the look of a film, a scene, a shot, or even a portion of a shot, altering work that would be traditionally understood as—and credited to—the cinematographer. It represented what would become a recurring theme in the struggle over integrating digital tools into established production methods: a simultaneous sense of the promise and the threat embodied in the new tools, an excitement over new degrees of control and creativity and a realization that the ability to control and create color was no longer exclusive to the cinematographer.

Two films produced in the late 1990s, *Pleasantville* (1998) and *O Brother Where Art Thou* (2000), came to represent the problems and possibilities of DI for the craft culture of cinematography. *Pleasantville* used the ability to "colorize" or "de-colorize" portions of shots as central to the narrative, which centered on the intrusion of "modern" life, in color, on the black-and-white world of a 1950s sitcom. Although cinematographers had been among the loudest critics of manipulating color in the colorization debates of the mid-1980s, they generally accepted this new application of the technology.[72] To cinematographers, while *Pleasantville*'s use of color was a

[72] Colorization was a process of adding color to black and white films from the studio's back catalogs for re-presentation, usually on television. Colorization was one of the early applications of digital technique to motion pictures. Early colorization techniques were crude and controversies erupted in the mid-1980s when media mogul Ted Turner announced a plan to convert the back catalog of MGM Studios, which he had purchased as material for his Turner cable networks.

cinematographic gimmick, the technique of draining color from select scenes or objects was seen as motivated by the storytelling, and, in any case, more akin to a special effect than cinematography. Nonetheless, *Pleasantville* was prominently profiled in *AC* in November 1998 and became part of the wider discussion.

Pleasantville showcased the possibilities of DI in dramatic fashion, but it was the work of cinematographer Roger Deakins on the film *O Brother Where Art Thou* (2000) that became the watershed moment for the DI process as a part of the cinematographic "art." In *O Brother*, the palette of the entire film was shifted using DI to create a washed-out sepia tone that supported the Depression-era milieu of the story. Deakins was already an award-winning cinematographer and member of the BSC and ASC by 1998 (when production of film began) and a five-time collaborator with the film's writer/director/producer team, the Coen Brothers. In October 1998, he wrote an influential description—and defense—of the DI process in *AC* titled "DIs, Luddites, and Other Musings." Deakins ultimately won several awards for his work on the film and many cinematographers point to *O Brother* as the "birth of DI."

These two films, both produced in the 1998-1999 time period, were important moments for cinematography because they pointed toward future debates about the relationship of cinematographers to digital cinema. *Pleasantville* illustrated the need for cinematographers to adopt more flexible attitudes about the relationship of a film's "look" to its narrative. In short, look would become even more subservient to the demands of story as the possibilities of new, mixed looks opened up and cinematography became more enmeshed with other craft areas, like laboratory work and special effects houses. Meanwhile, *O Brother* demonstrated a respected cinematographer's assertion of a traditional kind of craft authority in this setting, as Deakins shaped a consistent but still highly manipulated "look" using the DI process. In the new cinematography, a multitude

of looks, or even mixing formerly distinct looks such as black-and-white with color, alongside a need to maintain unusual or difficult looks (on film) through an increasingly complex workflow would become much more commonplace.

Chapters 6 and 7: Cinematographers and the Digital Camera

As with the DI, the emergence of movies produced using alternate formats such as video- and digital-origination represented both a threat and promise to the structures of authority within their craft tradition. Unlike the DI, though, the production camera lies at the heart of the craft, a key piece of the technological system the cinematographer is charged to understand and use. The production camera as a technological system is central to my analysis—a camera must record images, of course, and knowing the capacities and limitations of the recording medium is one of the cinematographer's first priorities.

However, the design of a production camera also embodies many aspects of the craft culture of cinematography. Will available lenses offer ways to use the cinematic language of cinematography such as depth of field, rack focus, contrast range, and the like? Will the fittings, dials, and attachments of the camera support the familiar structure of the camera crew? Will the camera's viewfinder require the operator to use an on-set monitor, dramatically shifting the camera department's authority around when a finished shot is a "print take," i.e., a useable shot? Even the notion of a "print take," a formerly significant decision-point of the cinematographer, was changed by digital cameras and the use of on-set monitors.

Productions that demonstrated and performed "professional cinematography" with the new production tools, then, were important craft texts. They would not only attempt to show the practicality and image quality of the cameras (although in many cases they failed on this count) but more importantly began the process of enfolding those

new looks and new practices into the definition of "masterful" cinematography. John Bailey, a veteran cinematographer with many credits to his name and a career that began in the early 1970s under the tutelage of star cinematographers such as Vilmos Zsigmond and Nestor Almendros, emerged as one of the most prominent and vociferous opponents to digital cinematography early 2000s, taking particular issue with the "film is dead" rhetorical jabs of producer George Lucas (*Star Wars*) and others in a series of op-eds and columns in the *Los Angeles Times* and *AC*. In the late 1990s, George Lucas had announced a partnership with Sony to create a line of digital movie cameras to photograph his *Star Wars* prequels and several filmmakers, including Robert Rodriguez, followed his lead into digital filmmaking. The new cameras received considerable notice and generated a great deal of press for Sony, but by and large these cameras—much like Lucas and Rodriguez—were considered outside the mainstream of Hollywood production practice and unlikely to be widely adopted. In 2000, when Bailey agreed to photograph *The Anniversary Party* with a hybrid digital-video camera, the production became a turning point in the discussion of digital origination of movies. Bailey's voluminous commentary on his experience and the resulting film were closely watched and widely discussed in the trade.

The Anniversary Party and *Star Wars: Attack of the Clones*, along with two other digital-originated films from this period, *Personal Velocity* and *Collateral,* provide interesting case studies of the relationship of this craft culture to the production camera as the primary tool of the cinematographer, and how cinematographers negotiated the particular capabilities of the digital camera, as opposed to the film camera. High-profile "demonstrations" like these lent an important credibility to digital cinema, but the suggestions and insights that these cinematographers and his collaborators produced were

enormously influential in the craft discussion of digital cinematography and shaped later forays into digital production.

Chapter 8: D-Cinema, the StEM project, and the ASC Technology Committee

Digital exhibition, or d-cinema, emerged as a cost-saving goal of distributors and exhibitors in the late 1990s.[73] Filmmakers had grown resigned to the reality of traditional projectors scratching, breaking, and degrading their films' print quality within one or two screenings, and so they welcomed this possibility, but only if the image quality could match that of 35mm film. Aggressive R&D strategies from several technology firms, most notably Texas Instruments and Sony, led to advances in the resolution and color rendition of digital projectors by the late 1990s, although the projectors were still extremely expensive. The cost of converting over 35,000 theatrical screens in the U.S., much less tens of thousands more screens in the global marketplace, slowed down the adoption of d-Cinema, even after several successful demonstrations of the projectors, including a limited release digital screening of *Star Wars: Attack of the Clones* in 2002. Moreover, the not inconsiderable problems of standardizing release formats (the computer language in which the movie was encoded), the threat of piracy, and a reliable method of evaluating color rendition and image quality across such a system threatened to derail the entire concept of d-Cinema. This was the environment that led to the creation in 2002 of the Digital Cinema Initiative LCC, a coalition of the Big Six movie studios, a group that tried to coordinate the technological transition and investigate ways of financing the expensive transition.

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[73] In this study, "exhibition" is defined as the system of delivering, securing, and projecting motion pictures for audiences. An "exhibitor" is the owner of the auditoriums, security systems, physical plant, etc., to show movies. Exhibitors are often described in the aggregate as "screens," e.g., a movie may be distributed to thousands of screens for opening weekend. The projector is the device that actually projects the moving images in a movie theater. Exhibition, then, is a system that includes distributors that prepare and transports movies and exhibitors that provide the screens for projection.

In 2002, Stephen Poster, then-president of the ASC, asked Curtis Clark to convene a Technology Committee for the ASC. Clark was a veteran cinematographer with considerable experience in commercial production and the use of digital tools in commercial cinematography. Clark wrote a mission for the committee that stated, in part, a need to protect the "art and craft" of cinematography in the digital era and he assembled a group that included award-winning cinematographers and, to an unprecedented degree, engineers and research and development personnel from the vendor-community in Hollywood. In 2003, DCI approached the ASC Technology Committee to design and shoot a short film to be titled the ASC/DCI Standard Evaluation Material, or StEM. This film was intended to test the capabilities of digital projectors for theatrical exhibition. In the words of one informant, the goal was to "break" the new digital projectors by comparing them to the capabilities of film projectors. The StEM project was a key step in creating a "test file" for evaluating digital projector's abilities to match the quality of traditional film projection.

The StEM turned out to be a primer on the cinematographer's art. The framing idea for the short—an Italian wedding—was proposed by Dante Spinotti, a respected cinematographer and frequent collaborator with a director, Michael Mann, known for stylistic experimentation. The StEM was photographed by Allen Daviau in collaboration with some of the most respected veteran cinematographers in Hollywood, many of whom were in semi-retirement at the time. This scenario, which certainly owed much to cinematographers' sense of the key images of their shared history, was crafted with as many challenging cinematographic situations as possible—situations like rain at night, fog, bicycles going past picket fences, high contrast settings, magic hour shots, and the like. The StEM was shot on a studio back-lot, on film and in a variety of digital formats, and finished with state of the art post-production facilities, including DI.

In this chapter, I analyze the StEM as what John Caldwell terms a "fully embedded deep text" in the craft of cinematography—a text, not intended for public consumption, that functions to coordinate understandings within and between proprietary worlds of work and involved in the formation and maintenance of professionalized groups.[74] With the StEM, cinematographers reaffirmed their position at the intersection of technical and aesthetic definitions of cinema. By collaborating with SMPTE and the DCI to define a working system for d-cinema, they advanced a craft agenda—to protect a standard of image quality that adhered to their craft definition of quality and begin the process of establishing new more technocratic craft practices around workflow and look management that would be central to digital cinematography. A close reading of the StEM reveals much about cinematographers' expectations for the members of this craft culture, and of the expectations they would have of the new digital tools. They were realizing that digital cinema would replace the dominant film-based technologies of their craft tradition and by creating texts such as *The Anniversary Party* and the StEM, key figures like Bailey, Daviau, Clark, and Spinotti were working in different ways to enforce the boundaries of their craft culture while showing a way forward into digital cinematography.

By 2011, Hollywood's "hybrid" workflows were becoming a regular part of production practice (See Table One). Almost half of the twenty-five top grossing films in the first seven months of 2011 originated on film (although many had extensive digital special effects as well). Three of the twenty-five titles were live action films that originated entirely on video or digital cameras and six were animated films (all of which were produced with computer animation tools). Six titles could be classified as requiring hybrid cinematography, involving some mix of film, video, or digital capture. All of the

[74] Caldwell, *Production Culture*, 26

films in the top twenty-five went through the digital intermediate process and are thus the product of "hybrid" workflows in that sense. The digital intermediate has become a standard practice in studio production, sometimes over the protest of cinematographers, many of whom still see it as an unnecessary step that allows non-cinematographers to influence the look of the film.[75]

Table 1: Production technologies, 2011 Top-Grossing Feature Films, as of July 2011.[76]

Film Origination	*Harry Potter: The Deathly Hallows*, *Fast Five*, *Thor*, *Bridesmaids*, *X-Men: First Class*, *Super 8*, *The King's Speech*, *Green Lantern*, *Bad Teacher*, *True Grit*
Hybrid Origination (film and digital)	*Transformers: Dark of the Moon*, *Hangover II*, *Just Go With It*, *The Green Hornet*, *Battle: Los Angeles*, *Limitless*.
Video or Digital Origination	*Pirates of the Caribbean: On Stranger Tides*, *Horrible Bosses*, *Justin Beiber: Never Say Never*.
Animated	*Cars 2*, *Kung Fu Panda*, *Rio*, *Rango*, *Hop*, *Gnomeo and Juliet*

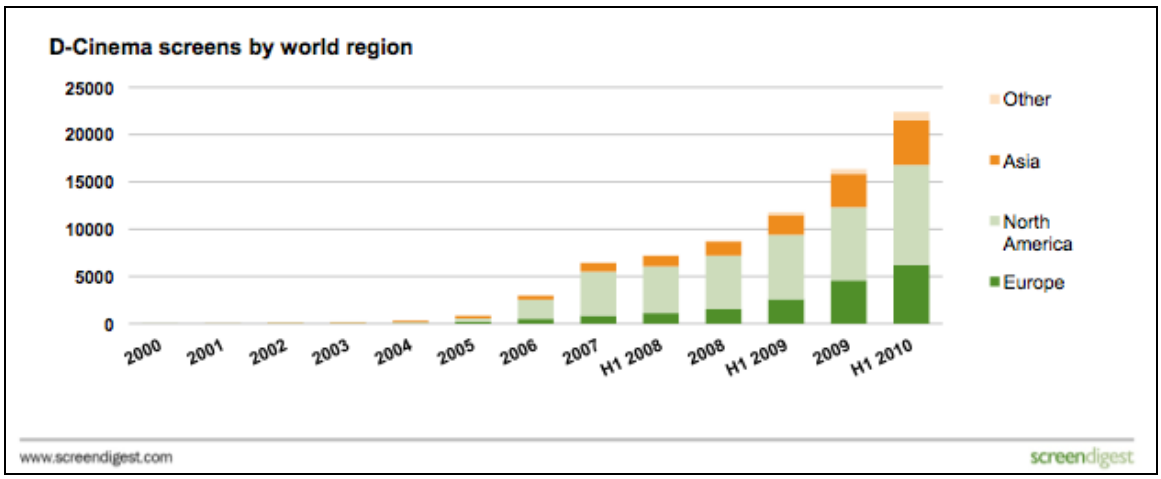
Likewise, d-Cinema is rapidly expanding its reach in theatrical exhibition (See Table 2). The DCI Specification was released in 2005 and although there was a slow build-up in the years that followed (most adoption 2005-2009 took place in North America.), d-Cinema adoption accelerated greatly after 2010. As of mid-2011, about 40% of movie screens around the world, or roughly 47,000, were equipped to accept the DCI's Digital Cinema Package and projected digital movies. By mid-2011, a little over 50% of cinema screens in North America were digital, or roughly 20,000 of 39,000 screens. Europe and China were among the leading territories outside of North America, with roughly 12,000 and 5,500 screens respectively. Much of this transition has been funded

[75] See cinematographer John Bailey's "The DI Dilemma: Why I Still Love Celluloid," *American Cinematographer* 89:6 (June 2008), 92-97, and responding commentary and letters to the editor that followed in *AC*.

[76] Production method and box office information gathered from the Internet Movie Database <http://www.imdb.com/> and The Numbers box office data website <http://www.the-numbers.com/>.

by private or autonomous initiatives that financed the expensive transition for exhibitors through mechanisms such as the Virtual Print Fee.[77] Some countries have funded public initiatives to help independent or struggling sectors of the exhibition sector install digital projection. Around the world, digital exhibition is advancing quickly, doubling or tripling from year to year in some territories.[78]

Table 2: D-Cinema screens by world region.[79]



[77] The so-called "virtual print fee" (VPF) mechanism has financed most of the transition so far. In the VPF model, a third party finances an exhibitor's conversion costs, then recoups those through payments from both the exhibitors and the distributors (i.e., the studio), who are willing to pay the larger share of the VPF because of the reduced costs of digital distribution. In some cases, the studios have arranged "direct VPFs" and paid exhibitors directly for screening their films digitally. See Sarah McBride "Digital Movies Stalled over the Question of Who Pays." *Wall Street Journal*. October 27, 2005, B19. John Hopewell "Europe Goes Digital" *Variety* March 21 2010, 8 and David Halbfinger "With Theaters Barely Digital, Studios Push 3-D" *New York Times* March 13, 2008, E1.

[78] David Hancock "CinemaCon: Digital Changes Presentation" *CinemaTechGeek.com* <http://www.cinetechgeek.com/2011/06/12/cinemacon-2011-14-digital-changes-david-hancock/>, Accessed August 7, 2011 and "CineEurope Predicts Digital Domination," *Variety* (June 28, 2011), 15.

[79] Reproduced in the MPKE Consulting Digital Cinema FAQ, "What is the status of digital cinema today?" <http://mkpe.com/digital_cinema/faqs/tech_faqs.php#status>, Accessed July 15, 2011.

REFLEXIVITY, AUTONOMY, AND CRAFT AUTHORITY

In this study, we see cinematographers responding to the emergence of digital cinema, a wholesale change in the technological foundation of the industry. Their "self-theorizing disposition," as Caldwell terms it, is on rich display as they mull over the future of the craft, the on-set politics, and the ways their tools and knowledge serve them in push-and-pull of motion picture production.[80] Caldwell's observations about the continuous, constitutive role of reflexive discourse within production culture are confirmed in these accounts. But they also suggest that production culture is not a monolithic entity. Cinematography has its distinctive character—as do other craft areas—based on its particular position within the tissue of craft relationships, the limits and affordances of its aesthetically- and technologically-grounded authority, its idiosyncratic rituals and prejudices, and even its demographic characteristics. Cinematography, for instance, seems to be a community more influenced (and populated) by its international membership than other craft areas. Digitalization, although a moving target in my study, presented a challenge to this craft that I found to be qualitatively different than the other crafts' adoption of digital tools; digital cinematography not only restructured work teams, equipment provision, and schedules for cinematographers, but in shifting the very nature of image design and realization it came to be seen by many as an existential threat to cinematography as a craft culture.

Much academic discussion on creative labor has centered on questions of agency—particularly the paradoxical relationship of the "skilled bodies" of workers with creative input to the industrialized production of culture. Hesmondhalgh and Baker ask, "Are the values of self-realization, autonomy, and creativity [in cultural work] viable ethical goals in a system that so effectively appropriates them?" This is a difficult

[80] Caldwell, *Production Culture*, 18.

question, but it seems to me that in the collective production of culture the inquisitive and challenging nature of imagination mingles with the constitutionally conservative nature of craft in ways that do argue for the possibility, if not the unavoidable presence, of ethical beliefs and actions in such a system, even if they are "appropriated" in various ways. Arguably it is the very contradictions of the process itself that give rise to the complexity of cultural meaning and significance in film and television texts.

Cultural work is, as Hesmondhalgh and Baker write, bound with both professional and aesthetic forms of opportunity and obligation.[81] Autonomy, or the perception of autonomy, is certainly a valued commodity within cultural production. Still, autonomy seems like a word overly invested in individual expression to adequately describe the processes we will read about here. There are few if any autonomous decisions in this craft—only provisional and sometimes arbitrary ways of making your decisions stick. To be sure, there are divisions of labor, and there is technological expertise, union rules, and seniority of various kinds. There is also personality and political acumen and prestige, earned and unearned. Within this unwieldy contraption the precise nature of authority (be it "craft" or "creative") shifts around from project to project, from medium to medium, from genre to genre. The elaborate reflexive practices of craft workers is a product of this challenging social and cultural experience—a constant communicative stream in which regions of special competence are claimed, protected, and maintained. Authority is expressed less as an individual act of autonomy than a cultural-institutional performance in reference to myriad other forces converging on the needs and problems of a very specific production context.

Our definitions of authorship or of creative labor must be sensitive to the implications of this ongoing struggle to maintain one's piece of the conceptual work of

[81] David Hesmondhalgh and Sarah Baker. *Creative Labour: Media Work in Three Cultural Industries*. (New York: Routledge, 2011), 61-67.

cultural production. For cinematographers, their historical position rested on the limited range of "professional" production technologies, the medium of film, their control of certain production spaces, and the durable appeal of big-screen presentation; these all served to valorize their role as "guardians of the image." Yet, under digitalization the boundaries of craft membership and authority would have to change somewhat if cinematography was going to maintain its position. As an observer of this process I was intrigued, even impressed, by their responsiveness. Craft may be a term steeped in nostalgia, but as a strategy for mobilizing professional identity in a fluid work environment hostile to collective action, it served very well to describe the aesthetic-technical-occupational stakes for cinematographers. It helped them shape the future of cinema technology and motion picture production. I also found myself disappointed in some ways. I was surprised that the cinematographers' union, the International Cinematographer's Guild, was not by and large engaged in the defense of cinematography, although it did offer some training classes on technical aspects of digital production. Significantly, the ASC, a private and fraternal organization, was moved to act in its stead, stepping into the role of defender, not of cinematography as a form of labor, but as a craft. This speaks strongly to contemporary conceptions of the relation of self to work, of worker to society, and of cultural worker to industrial cultural production, and it seems of a piece with neo-liberal trends toward privatization and individuation.

I had wondered if digitalization would offer a chance for the craft to address some of the persistent criticisms of cinematography—its insular nature, the lack of gender, racial, and sexual diversity—by opening up avenues to new practitioners. But my sense is that a craft under threat—in its elite precincts, at least—becomes rather more focused on maintaining such boundaries. There is an understandable fear of "diluting" the esteem of its membership. The ASC has opened up its membership to some degree, although

underrepresentation is still an issue in the craft more broadly. These observations are somewhat conjectural, of course; more research needs to be done on this topic. What all of these questions tell me is that craft culture, far from being ethically-compromised, or an area of human experience and creativity "captured" by market logics, actually merits more and better attention from media scholars.

Finally, despite the protestations of cinematographers that the craft will always be an art first and a technical process second, it seems clear that the Hollywood cinematographers' work of imagining and creating images has become alienated from their artful claims to some extent. These days it is hard to imagine the legendary shared credit that followed Toland's contributions to *Citizen Kane* or a free-wheeling, outlaw-style injected into today's system as Raoul Coutard's or László Kovács' was in the 1960s. This is the question to keep in mind as you read this study: has cinematography become something more anonymous, bureaucratic, and technocratic in the digital era, or will it return, as it has in earlier decades, having assimilated the new technologies and found ways to assert its expressive, artistic potential?

Chapter 2: Art and Cinematographers

What do cinematographers mean when they talk about the "art of cinematography?" In what senses does a cinematographer produce work with cultural meaning? As this chapter will demonstrate, cinematographers believe their work is both highly technical and an expressive "artistic" practice. What resources do they draw on to support this claim? Why do they make it? Nearly any professional practice can make claims to expressive choices, of course, if not artfulness, but the work of cinematographers draws on specific high art traditions and these then become resources for explicit claims to authority within the practice of film production. As Bordwell and Staiger have written, during the early formation of the Hollywood group style, the ideals of classical art were a feature of the classical Hollywood cinema: "cinematographers turned their attention to the skillful achievement of classical goals. Beauty, spectacle, and technical virtuosity came to be recognized as signs of 'artistic' cinematography."[82] Keating has expanded on this conception of the "masterful" cinematographer, by showing how cinematography in the 1920s, 1930s, and 1940s was a product of a "multifuctionalist" ideal, committed to finding artful compromises between the sometimes incompatible demands of narrative, studio, and star performers.[83]

Cinematography's aesthetic imaginary was brought into question again with the emergence of digital technologies. Cinematographers initially responded skeptically to digital post-production and on-set practices as a poor substitute for 35mm film. Once it became clear that digital imaging had uses in production, their responses were often expressed in self-consciously artistic language, from the dismissive: "It's like oil to

[82] Bordwell, et al., *Classical Hollywood Cinema*, 255.
[83] Keating, *Hollywood Lighting*, 192.

acrylics. We are changing the canvas a bit. But that is inevitable," to the sanguine: "Digital is another kind of paint on the palette."[84] Patrick Stewart, a cinematographer with considerable experience with digital video, said:

> It will become a media [sic] that people will shoot on when they know exactly what they are shooting and they know what they are going to get and they have got the budget to do it and there is a reason to do it. It's the same reason that people paint with oil paints or water colors or acrylics.[85]

As this chapter will show, cinematographers routinely invoke other artistic traditions—music, cooking—as a discursive resource for describing their work to themselves and others, and the "fine art" of painting is one of the popular touchstones. References to high culture forms and classical aesthetics have long been part of cinematography's explanation of its contribution to the art of cinema. However, digital cinematography represented a threat to that discourse on several levels: from the oft-mentioned "democratization" or de-professionalization of media tools (through mass-marketing of video cameras, desktop editing, and alternative modes of distribution) to an expanding frontier of acceptably professional "looks" that saw the proliferation of amateur-seeming or news-camera footage in the previously privileged aesthetic spaces of movie theatres and prime-time television.[86]

New looks and competing aesthetic regimes have always been a part of cinematography; indeed, cinematographers see interpreting such shifts as a significant aspect of the craft. As a group that served as carriers of classical values across decades of technical and aesthetic change, finding solutions that balanced competing demands of

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[84] Curtis Clark, interview by the author, July 22, 2005, transcript, and David Heuring, interview by the author , November 30, 2004, transcript.

[85] Patrick Stewart, interview by the author, July 22, 2005, transcript.

[86] David Bordwell, *The Way Hollywood Tells It* (Los Angeles: University of California Press, 2006), 121-138. Bordwell has described this mingling of heretofore segregated looks, formats, and visual qualities as an aspect of "intensified continuity," or a turn in film style since the 1970s toward more flashy, overt displays of stylishness.

technology, style, and narrative became a definition piece of the culture. Among other innovations of style and technology, cinematographers integrated the rise of color in the 1930s, widescreen cinema in the 1950s, and documentary techniques via the French New Wave in the 1960s. In each of these cases the broader craft culture of cinematography worked to develop discourse, practices, and standards for the new technique. However, digital techniques, by undermining the centrality of 35mm and shifting image-making into the dramatically more malleable and mobile realm of digital encoding, led to process of re-negotiating craft authority that was more complex than in past generations. Nonetheless, classical aesthetics and craft traditions have remained a prominent resource for addressing that negotiation.

CRAFT, ART, AND AESTHETICS

I use the term aesthetics advisedly, to differentiate this aspect of my subject from earlier debates about film style. Those critical debates have tended to cluster around specific media forms—film or television, for instance—whereas I want to focus on the workers themselves, a craft community for which these media-based distinctions, while not insignificant, are one of several that shape their practice, alongside photography, painting, and the like. I use the term aesthetics in a rather broad sense, not as a categorical notion and cultural artifact of nineteenth-century thought (as cinematographers often do) or even a "system" of qualities as Bordwell and Staiger do. Rather, following John Caldwell, I think of aesthetics as a "reference to the sensate and material world," as rules of thumb that people use to make choices when creating expressive culture in historically-specific situations.[87]

[87] John Caldwell, *Televisuality: Style, Crisis, and Authority in American Television* (New Jersey: Rutgers University Press, 1995), 353.

Valorizing older artistic traditions is a key strategy in cinematographers' self-descriptions. Yet, the cinematography manuals and the trade press I used to locate aesthetic discourses reveal a surprisingly imprecise sense of aesthetic value. For cinematographers, the complexity of work in film production and the studio-based division of labor creates a situation in which the value of those artistic traditions is constantly under threat, subject to negotiation and redefinition with other craft areas and traditions. In the case of cinematography, the inability to articulate an overarching aesthetic can be attributed largely to the supervening necessity of collaborating with other craft workers and decision-makers in the production process, of problem-solving in a complex interpersonal system. As will be discussed below, this "tissue of craft relationships"—characterized by both interdependence and competition—conditions many of the decisions a cinematographer may make. Primary among these is the appeal to narrative coherence. Aesthetics must "serve the story," or at least, that is how arguments are won. I will trace the ways that cinematographers negotiate this process with the aid of concepts such as "covering," "motivating," and "establishing"—terms that allow them to guide their decisions about visual design within the larger framework of narrative story-telling and professional relationships.

Cinematographers' claim to artistry, of course, is also shorthand for the argument that the cinematographer is more than a technician. In one popular manual, Blain Brown presents a typical statement in his introduction:

> Cinematography is more than the mere act of photography. It is the process of taking ideas, actions, emotional subtext, tone, and all other forms of non-verbal communication and *rendering them in visual terms*.[88] (his italics)

At the same time, technical complexities constantly confront cinematographers. The apparatus of film production—ranging from the enormous mobilization of personnel

[88] Brown,, ix.

and equipment for studio-based feature production to the mobile one- or two-person documentary-style production—always rested on a foundation of motion picture cameras, a source of light, a variety of 35mm film stocks, processing techniques and more, each with idiosyncratic limitations and possibilities. With the rise of digital techniques, the complexity of this apparatus grew enormously and presented cinematography with threats and opportunities they would have to negotiate. Whatever the medium, cinematography invariably requires a degree of technical expertise. Indeed, the discourse of cinematography as a craft is largely built around the seamless melding of technical skill and creativity. As Brown continues:

> While wielding these tools to fully utilize the language of cinema, there are of course continuous and unyielding technical requirements; it is up to the Director of Photography to ensure that these requirements are met and that nothing gets 'screwed up'…many seemingly mechanical requirements can also be used as forms of visual expression as well.[89]

As this quote suggests, to the cinematographer the technical requirements of cinema are at once "unyielding," a source of trouble ("screwing up"), and, nonetheless, the basis for their creativity. Within the craft culture of cinematography, then, "artful" cinematography balances aesthetic demands of beauty and style, narrative demands of the cinematic story, and the technical demands of "exposing" the film. Mastery of the form is less a matter of simply creating beautiful pictures than achieving a balance of these competing demands—using the technology to creative ends while avoiding being undermined by the debacles that so often accompany technically-intensive work. In practice, this balance is a matter of working within craft traditions while managing relationships with other craft workers (such as the production designer or editor), above-the-line personnel (such the producer, director, or star), and institutional demands of studio, laboratory, and suppliers.

[89] Ibid., x.

MEDIA STUDIES AND AESTHETICS

Caldwell has described the intellectual culture of film and television departments in the academy as segregated into camps of media theory and media production. It is likewise segregated into those that bring humanistic approaches to their analyses, versus more empirical, social scientific approaches.[90] Even within the humanistic study of media, there are differences between scholars who take critical, theoretically informed stands and those who use more grounded approaches to write histories and analyses of style, industry, or technology. In all of these cases (with the exception of a few historical studies of style), aesthetics is a marginal analytical category. Raymond Williams identified aesthetics as a "keyword" for cultural analysis, only to indicate that the word is so problematic as to be practically useless.[91] According to Williams, even as the term came into wide usage in the 19th century it was already suspect, trapped by its association with sense perception and thus evocative of unmanageable subjectivity. The discussion of aesthetics, for most observers, became part of the wider social process in which "art" was divided from "society." The former was idealistic, affective, disinterested, and universal; the latter was material, political, compromised, and contingent. It is not coincidental that this is the same period in which "arts" becomes segregated from "technology" and "industry," with a cascade of subsequent partitions, such as "artist," "artisan," and "craftsman," that still confound our understanding of the expressive aspect of cultural production.

Critical studies have grappled with this complex of pleasure, affect, and politics for generations. Adorno and other Frankfurt School thinkers were famously ambivalent about expressive culture, accepting of some elite forms and dismissive of the modern,

[90] Caldwell, *Televisuality,* 337.
[91] Williams, Keywords, 31-32.

mass forms of culture.[92] Williams sought to position art in its specificity, particular to a historical and cultural milieu. Aesthetics, in this theory, are just another contingency among others in the social formation.[93] The political significance of art—not as aesthetics but as taste—was further explained by Bourdieu, who illustrated how class-bound notions of pleasure and value underpin hierarchies of taste.[94] Hall argued that signifying practices pervade culture, from its notions of beauty through the stories it chooses to tell, but noted how meaning-making is an unstable process as it flows from producers, through texts, to viewers.[95] In all of these theories, art is collapsed into culture and aesthetics are pushed to the side in favor of explaining processes of meaning-creation. Within critical theory, then, the study of aesthetics had been a suspect enterprise, bearing the mark of a narrow-minded, production-centered analysis, and an unhealthy concern for standardization, formula, and repetition. In Adorno's terms, aesthetics are trivial in their specific expression: they are simply the rules by which the masks of pseudo-individuality are built. This seems to be the end-point for any discussion of a Hollywood classical style in cultural terms, in the sense that the "aesthetic" imperative for cinematographers is essentially a matter of providing novelty to a factory system—that the picture postcard colors of *O Brother Where Art Thou*? or the light-pollution of Los Angeles' city streets in *Collateral* were foremost a matter of stylistic differentiation.

One of the challenges of aesthetics lay in its confounding of a linguistic frame of analysis that centers on the articulation of meaning with economics. However, discursive practice is not confined to the linguistic or the economic. It emerges not just in language,

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[92] Theodor Adorno and Max Horkheimer, *Dialectic of Enlightenment*. (Stanford University Press, 2002), and Theodor Adorno, "Culture Industry reconsidered," in *Culture and Society: Contemporary Debates*, edited by Jeffrey Alexander and Jeffrey Siedman (Cambridge: Cambridge University Press, 1990), 277.
[93] Raymond Williams, *Problems in Materialism and Culture* (London: NLB, 1980).
[94] Pierre Bourdieu, *Distinction: A Social Judgment of Taste* (Cambridge, MA, Harvard University Press, 1984).
[95] Stuart Hall, "Encoding, Decoding," In *The Cultural Studies Reader*, edited by S. During (London: Routledge, 1993).

but in "lines, surfaces, and colors," in technique and gestures, and in the recognition and use of particular expressive effects.[96] Cinematographers recognize mastery in the ability to shed verbalization, replacing it with knowledge that is tacit, affective, and literally embodied—the ability to "see" the light on a set as a film stock will "see" it, to find a mood in combinations of shadow and color. In a 2002 manual and celebration of master cinematographers titled *Reflections*, Benjamin Bergery writes about "old-timers" knowing what 100 foot-candles of light (a measure of light intensity) look like on the back of their hands.[97] Cinematographers recognize that humans experience light *affectively*. Light and dark have meaning, although nearly inchoate and impervious to clear description. They know that too much light—or too little—is blinding, disturbing, and fear-inducing, and they know that sometimes fear can be pleasurable. Light cast from either extreme low-angles or extreme high-angles is ominous. Some shadows are pleasing; other shadows are frightening. Soft, scattered light, as at dusk, is flattering to the human face. Similarly, color has meanings that transcend language yet seem no less bound with culture, meaning, and emotion. Cinematographers express this relationship as "mood," finding the right mood for a story or a character. These are products of convention, to be sure, but cinematographers' sense of their idiosyncratic contribution, their authorship, of moving images rests on the ability to shape the use of shadow and color, to "create" and "correct" them in the production process to such meaningful ends. Again, these examples are not meant to suggest universal trans-cultural aesthetic qualities, but merely illustrate this aspect of cinematography as knowledge. It is difficult for some cinematographers to find words for the affective dimension of light and color,

[96] Michel Foucault, *The Archeology of Knowledge* (New York: Pantheon, 1972), 193.
[97] Benjamin Bergery, *Reflections: Twenty One Cinematographers at Work* (Hollywood, CA: ASC Press, 2002), 5.

much less how they come to recognize and use it, but for them light transcends the merely functional; to "see" is to "feel."

Over the last decade, Du Gay, Hall, and others have continued to revise the critical treatment of creativity with their work on "cultures of production/production of culture." As Negus writes, "the process of production is by no means as standardized, rational, and predictable as suggested by [the political economy] approach."[98] They argue that creators of culture play a key role in establishing what creativity is, what has meaning, and what is contested in a society. Ultimately, though, even these theorists are suspicious of aesthetics. While creativity merits critical attention, they still cast aestheticization as a malady; it is a symptom of how cultural production has become central to economic activity in advanced capitalist societies, a product of overproduction and the fetishization of design.[99] This seems to suggest that designers and others that "aestheticize" are rather uncomplicated in critical terms. However, following Caldwell, I hope to revise that account somewhat by close attention to this "art world" or "craft culture" of cinematographers as a culture unto itself, part of the wider production culture of film and television.

THE TISSUE OF CRAFT RELATIONSHIPS[100]

Caldwell has called this suspicion of aesthetics an example of "a radical distrust of the visible," and he sees it as a significant challenge for an intellectual culture trying to make sense of contemporary society. He writes: "What points of engagement can there be between a mass culture that defines itself by the image and an intellectual culture that

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[98] Keith Negus, "The Production of Culture," in Production of Culture/Cultures of Production, Paul du Gay, ed. (Thousand Oaks, CA: Sage, 1997), 83.

[99] See du Gay and Hall, 1997 and du Gay, 1997 on aesthetization. It is, to some extent, a concept similar to Bordwell's "intensified continuity" and Caldwell's "excessive style," but applied to a more general definition of culture that includes other forms of media, physical culture, food, and more.

[100] I'm borrowing a Durkheim-style organicist metaphor here, but I like this term for a double-edged sense of a robust social morphology and what I see as the fragility of those relationships in this milieu.

denigrates the image?"[101] He argues for an approach to media that reintegrates aesthetics. One of his solutions is to "desegregate" media production and media theory. Media makers, he argues, are already becoming sophisticated users of media theory, with a "self-theorizing disposition" that uses trade stories, interpersonal ritual, genres of disclosure, and the structural tensions between management and labor to express a particular form of "production culture."[102] Most cinematographers would scoff at the notion of themselves as "theorists" of anything, but they are sophisticated viewers and consumers of image and narrative.[103] Rather than the traditions of classical literature that underlay much media theory, though, classical art is their primary reference. In the negotiation of craft relationships, it is one of their reliable trump cards.

Craft has both external exigencies imposed by industrial and cultural formations, and internal, socially-generated frameworks that shape attitudes, behavior and values.[104] As a culture, craft offers the resources to deal with the everyday tasks for workers, while also shaping the public image of the occupation, educating prospective members, or migrating practices into other professions (especially ancillary or supporting areas of work, as in the case of digital cinematography, into post-production) and shape the relations of one craft area to neighboring areas of authority. Craft is especially important in these "border wars," where areas of professional responsibility and authority may be closely defined by a union contract but may also be relatively ill-defined and subject to debate and contestation.

In this section, I discuss five important craft relationships that cinematographers establish in the production process and aesthetic considerations shape those relationships.

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[101] Caldwell, *Televisuality*, 337.
[102] Caldwell, *Production Culture*, 15.
[103] Caldwell, *Production Culture*, 317. As Caldwell notes, the rhetorical disavowal of intellectual pretense is one of the most reliable features of production culture.
[104] Joseph Bensman and Robert Lilienfeld, *Craft and Consciousness: Occupational Technique and the Development of World Images* (New York, Aldine De Gruyter. 1991)

The traditional production process includes four phases: scriptwriting, pre-production, principal photography, and post-production.[105] As described in Chapter 1, a cinematographer manages the entire camera department: assistants, gaffers, best boys, and other support personnel as well as key post-production personnel such as the laboratory timer. For this discussion I focus on department heads with whom the cinematographer negotiates on equal or near-equal footing: the director, editor, production designer, sound mixer, and colorist. Each of these relationships was characterized by expectations and limitations, but as I will show, the relevance of these relationships to the craft of cinematography is less in a personalization of the relationships (for example, the cinematographer might never meet the editor), rather it lay in the cinematographer's sense of responsibility to those roles in the production process and how each impacted the craft authority of cinematography. The system of authority and expectations within this specialized division of labor was challenged by the tools and techniques of digital cinema, as will be described in the chapters to come.

The Cinematographer and the Scriptwriter

Not every show has a script (a documentary, for example, may have little or no script), but in narrative film and television production the script is a crucial document that provides the story structure, characters and dialogue, and descriptions of settings, costumes, and the like. Scripts (typically called screenplays in narrative feature production) have an industry standard format that facilitates budgeting and allows the craft areas to easily locate instructions relevant to their area. A script typically goes through multiple stages of development. Although there are many possible paths through development, most scripts begin with a treatment or synopsis, then several drafts and

[105] David Bordwell and Kristin Thompson, *Film Art*: *An Introduction, 8th ed*. (New York: McGraw-Hill, 2006), 14-21. My gloss of this process leaves out the process of funding (or fundraising) which is, of course, a necessary step in a professional production.

revisions as full-length scripts (often in collaboration with a producer or director), and at last the final, or shooting, script. Shooting scripts may also be revised once a show is in production, but this script is the vital planning document that department heads use to originate their aesthetic contribution, as well as schedule purchases, rentals, and so on. It is rare for a cinematographer to work directly with a scriptwriter, as a scriptwriter's work is mostly done well in advance of principal photography. For the cinematographer, the shot list, a list created by the assistant director of all the shots scheduled in each day's work, is the vital document.[106] Some scripts may include detailed instructions for the camera (movement, angle, etc.) but in most cases, those aspects of visual design are left to the director and cinematographer in their pre-planning. Most scriptwriting manuals, in fact, discourage writers from adding camera direction as an improper usurping of the director and cinematographer's role. Nonetheless, the scriptwriter's descriptions of character, mood, tone, and genre are powerful guiding statements for the cinematographer's design choices.

The Cinematographer and the Director

The director's role, after overseeing the completion of the shooting script, has several aspects. She is primarily responsible—formally, at least—for guiding the performers and designing the narrative as a whole, but also supervises the department heads, which may include a production designer, cinematographer, assistant director, sound department, supervising editor, and visual effects supervisor, among other positions.

Cinematographers often describe their relationships with directors as the most rewarding, and most fraught, in the profession. It can take many forms. The relationship may span years and many different projects, or it may be a short-term, one-off

[106] Brown, 242.

collaboration. Directors take different degrees of responsibility vis-à-vis setting the "look" of a film—some leave most major decisions (camera position, lenses, or lighting) to the cinematographer, others plan each shot meticulously. Some directors (and/or cinematographers) develop a plan to keep techniques in reserve or planning their deployment carefully, such as moving from short to long lenses, hard to soft light, or shifts in color as the story progresses, what Bordwell has called an "unfolding visual design" that reinforces the drama.[107]

Within most divisions of labor in Hollywood, the primacy of the director to make stylistic decision on this register is unquestioned, within certain boundaries.[108] In practice, what is "right for story" activates many discussions over the cinematographic look of the film. Cinematographer John Bailey, in the introduction to Bergery's *Reflections*, wrote: "Cinematography, even in all its magical splendor, is, ultimately, merely the handmaiden to drama."[109] However, given that the linkage between story, camera placement, color, and light is at the heart of the craft, cinematographers take their role as "storytellers" quite seriously. They are not on par with the director's authority in a formal sense, but the discourse of craft suggests that they should not abandon their greater responsibility to the workings of the narrative and communicating with the audience.

The collaboration between a cinematographer and director, although guided by the script, in many cases is founded on visual references they develop by looking at other

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[107] Bordwell, *The Way Hollywood Tells It*, 146. Bordwell suggests that a plotted "progression of techniques" have become more common since the 1960s and links them to development of intensified continuity.

[108] Series television is an important exception here, as journeyman directors often find themselves working within aesthetic constraints established by the series' cinematographer. This can be a difficult political situation for a cinematographer. A similar dynamic is found on feature films when the director is a novice. One commonplace in the lore of cinematography is that producers often hire novice directors—typically stars from other fields such as literature or the theatre, or actors—and expect the cinematographer to "hold hands" with the director and provide a basic professionalism to the production.

[109] Bergery, vii.

films or works of art together. Most cinematographers prefer to watch films with their directors to build that shared visual language about the "look" they are seeking. *Blade Runner* director Ridley Scott and cinematographer Jordan Cronenweth, for instance, attributed the look of that movie to Fritz Lang's *Metropolis* and the French artist Moebius.[110] The Coen Brothers describe arriving at an "old tinted postcard" look for *O Brother Where Art Thou*? through discussions with the cinematographer Roger Deakins.[111] The best case scenario for the cinematographer is a "symbiotic" relationship with a director, a fruitful creative partnership. Brown describes the relationship this way:

> The director of photography has some duties that are entirely technical, and the director has responsibilities with the script and actors, but in between these extremes they are both involved with the same basic task: storytelling with the camera—this is what makes their creative collaboration so important.[112]

If there's a detectable note of hopefulness and resignation in this quotation — the cinematographer's distracting technical obligations and the potential that the director will be seduced away by the performers—that contradiction may best characterize the relationship between directors and cinematographers. Even in the most equal of partnerships, collaborative in practice and form, the reality for cinematographers is that the director is always the first among equals in feature film production (as is the producer, in television production).

The Cinematographer and the Production Designer

The production designer, along with a film's art director, is responsible for realizing a film's settings, as described in the script. Brown describes the production designer one of the three people "directly responsible for all creative aspects of the film,"

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[110] Paul Sammon, *Future Noir: The Making of Blade Runner* (London: Onion Media, 1996), 74.
[111] James Mottram, *The Coen Brothers: The Life of the Mind* (Dulles, VA: Brassley, 2000), 157.
[112] Brown, ix.

the other two being the director and cinematographer.[113] This unit draws plans, oversees construction and painting, selects decorative elements and a palette and supervises costuming and property. A production designer has enormous influence on the look of a show, sometimes overseeing a "previsualization" process, in which detailed models, computer-generated images, or storyboards are used to precisely plan out the entire production, including shot selection.[114] Given an opportunity, cinematographers like to work closely with the production designer on color schemes and set design. The task is to turn a set into a "real" space whether on location or in a studio. At a minimum the cinematographer will want to see sketches and plans to see what opportunities there will be to light the set—are there windows? Skylights? A hard ceiling? Will there be "wild walls" that can be removed for camera movement? Allen Daviau described the role of the cinematographer as quite close to that of the production designer:

> To me, the most exciting relationships—besides the one I forge with the director—are with the production designer, art director, and sometimes the costume designer as well. So much of the look depends on what you put in front of the camera. If you don't have wonderful things in front of the camera, you can't make beautiful images. I gather up a lot of art books, photography books, pages cut from magazines—images I admire—to help shape my ideas about how I want a picture to look."[115]

The Cinematographer and Sound Department

The decades-long conflict between cinematographers and sound personnel is so familiar as to be a kind of family joke on most film sets. The humor lubricates a relationship characterized by genuine friction. Some of this tension is received wisdom that dates from the coming of sound in the late 1920s. The technical difficulties of

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[113] Brown, 242.

[114] If storyboards are created, cinematographers are often consulted. Storyboards may have a little or a lot of influence on actual shot selection, depending on the type of production, director preference, and authority of the cinematographer. For instance, a movie with a great deal of special effects integration is likely to lean heavily on pre-visualization and storyboarding.

[115] Quoted in Bergery, *Reflections*, 209.

recording sound allowed sound departments to usurp cinematographers' "art," that is to say, their ability to light sets and move the camera with the style to which they had become accustomed. This period of aesthetic subjection was short-lived, but, to "camera guys," the "sound guys" have been a problem ever since. In any event, the two departments responsible for recording the narrative performance are bound to disappoint each other on a regular basis with technical glitches and bad takes that ruin the other crew's "perfect" take.

A more central aspect of the professional ambivalence between camera and sound is rooted in the aesthetics of cinematography. The ideals of cinematography—detailed frames, narrative clarity, and beautiful light—are based on pre-sound stylistic innovations that balanced compositional elegance with narrative economy. The coming of sound either compromised these ideals or rendered them superfluous as dialogue did narrative work that previously "belonged" to cinematography. Advances in cinematography in the 1930s such as composition in depth and increased mobility were pointed precisely at increasing the narrative flexibility of the image itself and this ideal continues to shape the craft, even as sound more explicitly conveys the narrative and characterization. The rise of elaborate multi-track post-production sound design in the 1970s largely freed the sound department from its reliance on recorded sound from principal photography, as dialogue replacement, Foley arts (sounds effects), and other techniques allowed a film's entire soundtrack to be created in the sound designer's studio.[116] To some extent, this lessened tensions in the dependent relationship between picture and sound on the set. However, it also foreshadowed cinematographers' encounters with digital cinema, as a one-time "on-set" technique found its locus of creativity shifting into post-production.

[116] Capturing dialogue and ambient sound during principal photography remained a preferred technique, but advanced sound design allowed for creating (and re-creating) sounds not captured in the studio or on location.

The Cinematographer and the Editor

An editor always sits in judgment of the cinematographer, because the editor is tasked with assembling a cinematographer's individual shots into a cohesive whole. Cinematography manuals, without exception, highlight the cinematographers' relationship to the editor as one of *responsibility*, and they devote extensive space to discussions of editors' requirements. Of Mascelli's "Five C's of Cinematography," two are "continuity" and "cutting," aspects of the filmmaking ostensibly within the editor's domain. As Mascelli writes, though, "a theatrical feature, shot by experienced production personnel, is filmed with editorial requirements in mind."[117] Later, he writes:

> A film editor always strives to be on the player, object, or action in which the audience is most interested at that particular moment in the story. The cameraman should always keep this editorial requirement uppermost in his mind during production….[118]

A skilled editor may be able to save a picture from bad photography, but cinematographers are aware that an editor can also vastly change the visual experience of the motion picture:

> An experienced film editor can often cheat-cut a picture with such imagination that the completed film depicts a screen story that was conceived and created on the cutting bench, rather than in the camera. However, the cameraman should never let the editor's skill become a crutch when shooting.[119]

The Cinematographer and the Timer/Colorist:

Typically, on a film-based production, the camera department exposes film each day, with the director choosing which shots to "print." Each night, the laboratory develops the exposed film and a colorist prints the selected shots.[120] These "dailies" are

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[117] Joseph V. Mascelli, *The Five C's of Cinematography: Motion Picture Technique Simplified*, (Hollywood, CA: Cine/Graf, 1965), 170.
[118] Mascelli, *Five C's of Cinematography*, 171.
[119] Ibid.
[120] To save money, some productions will print "one light" dailies, meaning the color timing of each day's shots was simplified to save time and printing costs. In that case, the final colors and tonal values of each

returned to the production for review each day. The mechanical and photochemical processes in a modern film lab offered the cinematographer myriad aesthetic choices to change contrast, density, tone, the quality of the blacks, or of the whites. In years past, the "timer" was a laboratory technician responsible for printing the production's film according to instructions from the cinematographer; to that end, a professional cinematographer was expected to have close relationships with timers at a variety of laboratories. For instance, the cinematographer may discuss the script and story with the timer and produce "test strips" of film to establish the designed look of the film for future reference. A close cinematographer/timer relationship was often described as "intuitive," or "instinctive." Allen Daviau related a story of his experience shooting *Empire of the Sun* (1987) for Steven Spielberg that illustrates the closeness of this relationship: When the film was shooting a remote location inside the People's Republic of China, Daviau was required to send his dailies to England for processing. Rather than watching his dailies with Spielberg, then, Daviau described himself relying on the color timer in the laboratory, who would watch and describe the previous day's work to them on the telephone. According to Daviau, their "shared language" was crucial to making that arrangement work.[121] The timer was a specialist at the cranky, somewhat esoteric process of using timing lights and chemistry to create the looks a cinematographer wanted; in this way they were the cinematographer's partner in matching look to story. Bergery quotes a timer, "The timer should be interested in the film and understand the story, otherwise there's no point to his or her work."[122]

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shot will be evaluated and the film reprinted later in the production process. Cinematographers prefer to time film earlier in the production because they may not be invited (or paid) to assist with color timing if it happens during post-production.

[121] Allan Daviau, interview by the author, March 22, 2010, notes.

[122] Bergery, *Reflections*, 173.

As Chapter 4 will describe, one of the first felt consequences for cinematographers with the rise of digital cinematography was a new degree of authority for the colorist. A colorist was a specialist, not in printing film, but in manipulating color, tone, and visual qualities in digital cinema. Once film could be scanned, manipulated digitally, and printed back to film (as it would be in *Pleasantville* and *O Brother Where Art Thou*), the colorist emerged as a position with potentially enormous creative input in the process. Certainly, the director or producer (and, to some degree the cinematographer) remained a key arbiter of those decisions, but the skilled colorists became a valued commodity at post houses like Technicolor and Deluxe, and a new source of collaboration for directors to envision the "look" of the movies. The role of cinematographers was less clear, and certainly not as central as it had been when timers were producing their looks.

A professionally-produced film or television program has a uniformity of technical values that is completely naturalized in the film and television industries. If all of the "crafts" I described above succeed, it is assumed, there will be an integration of purpose that overcomes the friction of the craft collaboration and culminates in a "professional" sheen to the finished film.[123] Such a collective subjection to shared conventions of narrative, genre, and style is an important aspect of craft; however, each craft also seeks to find its own expressivity within this framework of industrial, creative logic. Of the many ways any particular shot, scene, or sequence might be designed, the craft worker seeks to both affect an integration of story, character, and mood that effaces its "craftedness" to some extent, but also performs a kind of craft mastery in that act of integration. "Masterful" cinematography is an adept handling of this tension; working

[123] Other craft areas might have been included here as well, including make-up artists and the actor, especially stars, who have a clear interest in the manner in which they are photographed. A close reading of a craft area is almost certain to reveal surprising dependencies and relationships that aren't at first apparent.

within the specialized division of labor, but also finding specifically craft-based expressions of accomplishment. The discourse of fine-art and "painting with light" is a key piece of that rhetorical move.

PAINTING WITH LIGHT

Painting has been a prominent reference and metaphor for cinematographers' understanding of their craft. To cite one example, the term *chiaroscuro* has been adopted from art history to become a commonplace term in both the craft and criticism of cinema. In art criticism, chiaroscuro describes a method in which precise light and dark values are used to promote an illusion of space and depth on a two-dimensional canvas. The term is typically associated with painters of the Baroque period, particularly Caravaggio (1571-1610) and Rembrandt (1606-1669). It has taken on a similar, but more general, meaning in cinema, indicating any visual style that makes aggressive use of light and shadow, or images with a high degree of contrast between bright and dark areas of the frame.

Representational painting as a reference and metaphor for cinematography dates to the earliest days of the profession.[124] In the early 1920s, cinematographer Garmes adopted the term "north light"—a reference to Rembrandt—to describe his method of creating soft, romantic, "expressively" lighted film images with a dominant single source.[125] A 1948 profile of prominent cinematographer Leon Shamroy explained the "debt" he owed to classical artists: "[Shamroy] draws his inspiration from the works of famous painters—admiring the subdued tones of Rembrandt's work, and the luminous color and photographic detail of Ruben's painting."[126] The 1949 book *Painting with Light*

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[124] Keating, *Hollywood Lighting*, 258. Keating notes that "painting with light" was part of discourse at least as early as 1930, when Victor Milner used it in a contribution to the *Cinematographic Annual*.

[125] The uses and attributions of these terms is idiosyncratic and doesn't necessarily reflect Rembrandt's style as understood by art historians. Garmes credited John Seitz and Victor Milner with the innovation of using strong top light, and may have coined "north light" as a descriptor.

[126] Also characteristically, the reference to high art is immediately recuperated: "Although his style as a cinematographer has its roots in art, he is no blind 'art for art's sake' devotee. He is well aware of the

was probably most responsible for solidifying the connection between cinematography and painting. The book, by Hollywood cinematographer John Alton, was one of earliest non-technical meditations on the aesthetics of cinematography and Alton's pedigree as one of the pioneers of *film noir* helped authorize his contribution to this central discourse in the craft.[127] The sorts of paintings and painters than cinematographers celebrate has varied through the decades, subject to changing tastes in popular, craft, and fine art culture, but the presumed affinity between these visual arts has been a durable idea in cinematography.

Cinematographers often draw comparisons between the technical challenges of working with film and those of working with materials such as oil paint or plaster (as in fresco). In *Reflections*, Bergery writes the job of the cinematographer is to "judge the plaster." Elsewhere, "There are a lot of people who have terrific taste, and wonderful eyes and sensibilities. But unless you know how to hold a paintbrush, you can't do anything with those abilities."[128] In the practice of painting, cinematographers see a model of the compromises they are expected to make between narrative, portraiture, style, and the two-dimensional image. Cinematographers' sense of their own contribution to the narrative economy of cinema rests precisely on their ability to load a frame with as much meaning as it will bear without destroying the beauty and legibility of the image. As Brown writes: "Studying classical art is useful in that a painter must tell the whole story in a single frame."[129] As a young cinematographer in 1947, Robert Surtees wrote an account of using Technicolor for the first time for the film *The Unfinished Dance* (1947):

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market for which his talents must be slanted. 'After all,' he points out, 'the professional cinematographer is helping to sell a screen story to an audience.'" Herb A. Lightman, "Painting with Technicolor Light," *American Cinematographer*, 28:6 (June 1947), 201.

[127] John Alton, *Painting with Light* (Los Angeles: University of California Press, 1995).

[128] Bergery, *Reflections*, 10

[129] Brown, 158

> From the study I put in viewing many famous paintings of the ballet, mostly the French Impressionistic School…I drew the conclusion that the ballet numbers should have as little contrast as possible.[130]

Surtees draws a line from Edgar Degas' iconic images of ballerinas through his own craft and the film image itself, projecting a look established in the 1870s through a story of the ballet produced in 1947. He uses fine art as both a model for his own aesthetic decision-making and a tool for explaining the look he created for his peers.[131]

The craft's penchant for intermingling narrative, composition, mood, and emotion in a dramatic, clear way is a key aspect of the aesthetics of professional cinematography. These qualities explain the prominence of classical art in discussions of cinematography. In Brown's textbook, the chapter titled "Lighting as Storytelling" is built around a case study of two paintings: "A Philosopher Giving a Lecture on the Orrery" by Joseph Wright of Derby and "The Calling of St. Matthew" by Caravaggio.[132] Both paintings feature stark images with large fields of almost-black shadows, careful compositions of dramatically punctuated light and figures that emerge from the black, some in silhouette, others haloed by back light, others with finely modeled features. (See Figures 1 and 2) The relationships of the participants are immediately clear from their positions, gestures, and attitude. For viewers of these paintings, the scenes and parables they portrayed would have been instantly clear. Explaining his choice of Derby and Caravaggio as examples, Brown writes:

> They are both powerful, enigmatic paintings that carry depths of meaning and content far beyond their visual beauty—the kind of thing we strive for everyday

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[130] *American Cinematographer*, (January 1948), 10

[131] Surtees' is an interesting example in another register because I found it rare for a cinematographer to cite impressionism as an inspiration. The impressionist period was the last for which cinematographers could plausibly reference classical painting as a model, being the moment before art turned toward abstraction (as photography and cinema took over representational reproduction). The impressionist style—marked by visible brushstrokes, open compositions, and muted contrast—is a poor fit with cinematographers' definitions of professional cinematography.

[132] Brown, 157.

> on the set. All that is missing is a producer in the background saying: "it's awfully dark, couldn't we add some fill light?"[133]

Cinematographers' interest in Caravaggio is enduring, as John Bailey wrote on his blog on the ASC web site in June 2011:

> No painter has so universally been a lodestone for cinematographers…his cinematic mise-en-scene, his dramatic staging and compositional daring alone are enough to elevate his work into intense veneration by filmmakers. But it is the light in the most mature paintings that almost burns through the canvas.[134]

If we compare the period that art historians term the "Baroque period" in relation to the twentieth century development of Hollywood cinematography, some interesting parallels emerge. The Baroque period must be understood in context of its appearance at a pivotal moment in the relationship between the Catholic Church (which still served as patron to most artists in the sixteenth century) and European culture. Changes in representational art after the sixteenth century can be traced to the institutional and cultural struggles over the Reformation, the Catholic Counter-Reformation, and the early years of the Enlightenment. Novel treatments of light as a symbol and narrative device were the result of the general epistemological turmoil—e.g., light coming to represent both knowledge and spirituality, darkness representing ignorance and sin. The new aesthetics might have been the result of the leaders of the Catholic Church and other institutions broadening their conception of the audience for the painting and sculpture they sponsored. Henceforth, art was to speak both to the literate, Latin-fluent elite, as well as the illiterate, uneducated masses. However one cares to balance these proximate causes, the move toward a more "populist" aesthetic form reached an apex in Baroque art. Dramatic lighting, visual tension, and narrative value replaced the more balanced, contemplative works of earlier eras. Baroque art was at once more detailed and appealed to emotions

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[133] Ibid., 156.

[134] John Bailey, "The Lost Painting: A Caravaggio Found," *John Bailey's Bailiwick Blog*, June 20, 2011, http://www.theasc.com/blog/2011/06/20/the-lost-painting-a-caravaggio-found/.

Figure 1. "A Philosopher Giving a Lecture on the Orrery," Joseph Wright of Derby, 1766.

Figure 2. "The Calling of Saint Matthew." Michelangelo Caravaggio. 1600.

rather than intellect. Caravaggio famously (and infamously) placed his Saints and Biblical characters in pedestrian, everyday settings, indicating their divinity with the rhetoric of light and complex compositions rather than simple centrality, physical beauty, or visual devices such as haloes or other motifs. There are other examples of turn toward visual narrative complexity, such as Georges de La Tour (1593-1652), who composed paintings that used single sources of artificial light, such as firelight or candles, to great dramatic effect, an effect that Derby later uses in even sharper contrast. Rembrandt (1606-1669) added secular subjects, stark contrast, and intimate, compassionate portraiture.[135]

Although cinematographers continually describe their work as "painting with light," they do not paint with just any light they find, and the prominence of these painters in manuals and discussions of cinematographic aesthetics is instructive. The innovations of the Baroque period—narrative economy, *chiaroscuro*, portrayals of artificial light, and compositions that formally privilege the human (or divine) face while maintaining a sense of naturalism—these developments were important to early cinematographers and became the basis for the aesthetic imagination of the craft. Likewise, a fascination with the quality of blacks, or darkness, in the frame has persisted. (Although few films have the degree of contrast we see in the Derby or Caravaggio, craft fascination with the *noir* cycle or low light effects like firelight and candlelight might be read as a lingering reference to the painterly fascination with darkness and light.) Like the classical painters before them, this aesthetic foundation solves a set of crucial, intermingled problems for cinematographers: their patrons desired a wide audience; they were seeking a language to describe their own artistic and technical virtuosity, and needed an aesthetic model that resolved these sometimes contradictory demands.

[135] Edmond Feldman, *Varieties of Visual Experience* (Englewood Cliffs, NJ, Prentice Hall, 1993). 220-222.

CLASSICAL AESTHETICS AND CINEMATOGRAPHY

Despite the importance of fine art and classical principles in cinematographer's aesthetic conversations, they are remarkably vague about particular aesthetic principles. This may be because the craft is ultimately guided by pragmatic problem-solving rather than universal notions of beauty. A common locution in training manuals is that cinematographers establish the "mood" of the film. Mood is described as a "sixth sense," as a "continuity device," as the musical "key" of the film. Mood, then, is a rather vague signifier for emotional quality and fit with the story. The source of mood, though, is less vague: it is attributed to the cinematographer's skill. A 1947 *AC* article, "Mood in the Motion Picture," stated: "It is possible to say that the factor which contributes most directly and forcefully to the synthesis of cinematic mood is the motion picture camera," which is to say, the cinematographer.[137] Still, the construction of specific moods is largely unexplained in articles such as this, except in very tactical terms such as how to light for a "candle scene," "flashlight scene," or "firelight scene." As Keating has described, these sorts of "effect-lighting" conventions (i.e., a "table lamp" effect) became part of the standard toolkit of cinematographers, part of systems of rules they drew on to choose lighting techniques that matched story with mood and setting. This process was often started by the specifications in the shooting script.[138] A skillful cinematographer would know how to deploy the effect in line with character and mood, as well as with the institutional demands of genre and star persona. The practice of cinematography rested uneasily between these aesthetic formulae and the talents of the individual cinematographer. A typical treatment of aesthetics is found in Joseph Mascelli's "The 5

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137 Herb Lightman, "Mood in the Motion Picture," *American Cinematographer* 28:2, (February 1947), 48-9, 69.

138 See Keating, *Hollywood Lighting*, 133-140, 173 on the relationship between effect-lighting and storytelling. Not all effect-lighting was the product of directions from a shooting script, but often was as a matter of descriptions of setting, set dressing, or props.

C's of Cinematography," one of the earliest textbooks on cinematography technique. In a chapter on "Composition" (the fifth "C"), Mascelli writes, flatly: "there are no rules for composition." This statement is then followed by a list of compositional formulae, as in the following compilation of "viewer interpretations of various compositional lines:"

> straight lines suggest masculinity and strength
> softly curved lines suggest feminity, delicate qualities
> sharply curved lines suggest action and gaiety
> long vertical lines with tapering ends suggest dignified beauty and melancholy
> long horizontal lines suggest quiet and restfulness
> tall vertical lines suggest strength and dignity
> parallel, diagonal lines indicate action, energy, and violence
> opposing diagonals suggest conflict
> strong, heavy, sharp lines suggest brightfulness, laughter, excitement
> soft lines suggest solemnity, tranquility
> irregular lines are more interesting that regular lines

Mascelli provides similar formula for "form" (e.g., "triangles suggests stability…"), "movement," and "balance."

In texts such as these, the aesthetics of cinematography are treated as one with presumed universal qualities of good design. In his 2002 textbook, Brown writes: "Certain basic principles pertain to all types of visual design, whether in film, photography, painting, or drawing."[140] Rather than Mascelli's five "Cs", Brown defines the basic principles as: *unity, balance, visual tension, visual rhythm, proportion, contrast, texture,* and *directionality*. Like Mascelli, though, Brown's overarching goal is a musical metaphor straight out of the classical repertoire: *harmony* and *economy*. "A simple composition is economical in use of line, form, mass, and movement; includes only one center of interest, has unified style which harmoniously integrates camera angles, lighting, tone, and color."[141]

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[140] Brown, 6.
[141] Ibid.

At the same time, though, these texts pose cinematography as reliant on intuition, talent, and experience, as when Bergery quotes Jordan Cronenweth on the value of resourcefulness:

> You are always working under changing conditions. Every location has its own set of problems. As you learn your craft, you find more and more solutions to problems, solutions that allow you to work with the style that you have chosen… a lot of photography is done simply by feel.[142]

This oscillation between aesthetic formulae and individual expressiveness is characteristic of efforts to explain craft-oriented work. "Masterful" work is subject to post hoc rationalizing: Brown describes the camera work of Kubrick and Kurosawa as "painterly," in that "every element, every color, every shadow is there for a purpose and its part in the visual and storytelling scheme has been carefully thought out."[143] But the French New Wave cinematographers were masters, as well: "They reveled in the randomness and immediacy of the slightly shaky handheld camera."[144] We see the same move in a 1950 review of *The Asphalt Jungle* in *AC*, reporting that director John Huston had asked for a "starkly realistic" style, extensive location shooting, and avoiding "glamour photography" on the film's stars:

> In shooting the picture, [cinematographer Hal] Rosson avoided the usual "documentary" style…which has become of vogue with World War II. Rosson proves in this picture that a craftsman who knows his tools can combine realism with the kind of technical finish one has come to expect of Grade-A studio product.[145]

The quote makes an unusual disavowal of documentary style in the service of a more "finished" realism, the kind of balance it takes a true "craftsman" to achieve.

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[142] Bergery, 27.
[143] Brown, 158.
[144] Ibid., 60.
[145] Herb Lightman, "Realism with a Master's Touch," *American Cinematographer*. (August 1950), 271.

COVERING, MOTIVATING, ESTABLISHING, AND CONTINUITY

Cinematographers have developed language that serves as a bridge between aesthetic demands of their craft, the demands of integrating the efforts of other craft areas, and production efficiencies. Coverage, motivation, establishing, and continuity are key terms that drive the choices of shots, but also illustrate how those choices are conditioned by craft relationships.

Coverage

Coverage describes the imperative to give the editors (and director) adequate and appropriate options when assembling the footage into a finished film. The cinematographer shoots the entire script (dialogue and action) but also "cutaways" and "insert shots" that the editors may find useful. Additional material like this may be the choice of the director, but is often collected by a cinematographer, or even a "second unit" cinematographer who shoots relatively unsupervised (although often guided by storyboards). Approaches to coverage may vary—some directors shooting only exactly what they need, others shooting copiously to give themselves options in the edit suite. Such choices are often indicative of the director's seeking independence from the editor, as when producer Christine Vachon complained about "macho" directors who rely on single long takes, thereby reducing the editor's choices further down the production pipeline.[146]

Typically, though, camera movement and framing choices such as "long," "medium," and "close" shots are planned in advance by the director or cinematographer for formal or aesthetic unity, and shaped by the demand for coverage. Moreover, the coverage must "match:" shots that might be edited together must match visually and technically in the lighting, color, exposure, and composition. Note that the

[146] Quoted in Bordwell, *The Way Hollywood Tells It*, 153.

cinematographer rarely knows how the film will be edited, so his or her choices in these moments may be decisive. If the director expects to use an editing device such as cross-cutting or montage, the cinematographer will adjust the coverage. The term "protection" is synonym for coverage and probably better captures its spirit—the cinematography is responsible for protecting the final film with adequate coverage.

Motivation

A key aspect of the rhetoric of the camera in classical cinema is that the filmmaker's choices are "motivated." Edits, camera movements, focal points, length of the lens, all of these devices must be motivated. Bordwell has described motivation in the classical Hollywood cinema as being of four types: compositional, realistic, intertextual, and artistic.[147] Cinematographers participate in each of these, but most clearly in compositional motivation, or visually presenting all the required story elements. They also employ artistic motivation, or what Bordwell calls "flagrant technical virtuosity" for the sake of spectacle or showmanship, again a kind of "product differentiation."[148] From the point of view of craft, though, the appeal to motivation is a means to organize aesthetic choices and resolve disputes in the production process. Cinematographers, when planning shots or choosing shots on the set, will filter aesthetic possibilities through the need for motivation and defend their choices on those grounds. Motivation is often negotiated on the basis of story causality, as Bordwell notes, and the question "is it good for the story?" launches many discussions on the set that ultimately define aesthetic choices. But motivation may also be more abstract or affective, contributing a mood or sense of pace, and cinematographers may also marshal arguments on these grounds.

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[147] Bordwell, Staiger, and Thompson, *Classical Hollywood Cinema*, 19.
[148] Ibid, 21.

Establishing

This is another term cinematographers use to define and defend their choices and, as with the other terms I've described here, it provides a link between story, aesthetics, and the network of craft relationships. Cinematographers evaluate a prospective shot based on whether the content has been adequately *established* by a shot that may precede or follow it. For instance, a cinematographer may resist filming a close-up if it hasn't been established properly with a wider shot. The cinematographer knows there will be no way for an editor to "cut in" to the closer shot without confusing the audience or muddling the story, therefore violating the necessity for adequate coverage. Coverage choices like this may ultimately come down to directorial prerogative, but professional standards as well as craft sensibility demand that a cinematographer push for aesthetic choices that he sees as supporting the storytelling function.

Continuity

Each of the terms above—coverage, motivation, establishing—supports continuity. After the 1910s, as Staiger has written, the function of the "continuity script"—a precursor to the shooting script—was to provide a plan and template for this integration of efforts, the Hollywood definition of professionalism, and adherence to a shared style.[149] Cinematographers' commitment to continuity would be hard to overstate. As Mascelli writes: "It is the continuous aspect of the motion picture…that decides the success or failure of the production." Continuity goes beyond providing coverage for smooth, seamless editing. Stephen Lighthill, a cinematography instructor at the American Film Institute, said:

> What I teach here is that consistency is one of the most important aspects of cinematography. If you look like you in this room, when I see you in this room at

[149] Bordwell, Staiger, and Thompson. *Classical Hollywood Cinema*, 146.

> night, you have to look like you, not a different person. That means the way your features are altered by focal length of a lens, skin tone and how that is represented, right? It's enormously important to what we do, to be consistent.[150]

In Brown's chapter on continuity, he writes:

> Most of these techniques and rules are based on one principle—to not create confusion in the mind of the audience and thus distract them from the story or annoy and frustrate them.[151]

In the craft of cinematography, continuity implies a commitment to a certain form of realism, that of a seamless diegesis. Faulty continuity implies distraction and a breakdown in the world of the movie. To a cinematographer the "world" of the script is only a piece of the experience of the film. The principles of visual design and mood that comprise the craft of cinematography are equally an affective "world" that must be built and sustained. Thus, for a cinematographer continuity implies both a narrative and aesthetic process.

THE POLITICS OF CINEMATOGRAPHY

The cinematographers' (and other craft workers') responsibility for the diegesis and the audience's desire to "lose" itself in that world is a classical notion. According to this ideal—the Gnostic sense of art as overtaking the self—the goal of art is to cause the viewer to lose the self in the work, to suspend his or her disbelief in the experience of a unified, continuous, hermetic art-world. This was an aspect of ecclesiastical notions of art as well. Whether Caravaggio was painting for his patrons in the Vatican or Gregg Toland was shooting for Goldwyn, the idea of grasping an audience's attention was paramount.

In this way, cinematographers' embrace of classical aesthetics is a political choice. Benjamin contrasted the political possibilities inherent in painting as against cinema, using cinema as an example of a medium that can undermine the conservative or

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[150] Stephen Lighthill, interview by the author, August 20, 2005, transcript.
[151] Brown, 83.

fascistic potential in a classical art. He traces that potential to the near-metaphysical sense of presence, or *aura*, that accompanies an "original" work, such as a painting. In critical media studies, Benjamin's ideas have been used to argue that mechanically reproduced works hold more possibility for revolutionary or resistant uses, especially in the reception and uses of modern forms of mass-consumed art. To the extent that new forms of mass-produced art are more pervasive and ubiquitous, they become, as Benjamin writes, akin to architecture, part of the lived, everyday experience of the people—their consumption in a state of "distraction," rather than awe, breaks the mystical hold of aura.[152]

The role of the creator or creators of a work of art in Benjamin's theory is more opaque. Indeed, Benjamin posits the end of the "basic character" of authorship. Nonetheless, I believe his curious use of the term "work of art" rather than simply "art" is telling. "Art" not only does cultural "work;" it is the product of labor itself. Benjamin contrasts the work of painting with that of cinema in the course of his argument, but there is some irony here because, as we have seen, professional cinematographers have embraced classical values and the fine art of painting as their legacy. Perhaps this embrace would be unsurprising to Benjamin. "So long as the movie-maker's capital sets the fashion, as a rule no other revolutionary merit can be accredited to film," he writes.[153] Rather than establishing the progressive potential of cinema through new forms of performance and editing and novel configurations of space and time (as the Soviet experimentalists had), the "movie capital" of Hollywood has reinvented *aura* by the promotion of star personalities and the marketing of the experience of cinema as a commodity. To be sure, Benjamin sees revolutionary potential in the cameraman. Whereas painters must present a "total" picture, he writes, the cameraman "collects

[152] Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," in *Illuminations: Essays and Reflections*, H. Arendt, ed. (New York, Schocken, 1969), 221.
[153] Benjamin, "*The Work of Art…*", 230.

multiple fragments which are assembled under a new law,"—potentially a more progressive form, independent of the original. Professional cinematographers, though, demonstrate the limits of this conception of cinema. They seek the mantle of authorship of their images, of "total" pictures in the sense established by classical art. In their devotion to classical aesthetics and by assisting the glamorization of stars, they would seem to keep cinema in the realm of ritual, rather than politics.

If anything, the history and aesthetics of cinematography reveal how "tradition" reasserts itself, classicism is reaffirmed, as art becomes reattached to new forms of expression through labor and craft practices. Part of the process that Benjamin celebrates with the coming of mechanical reproduction, the re-imagining of art as politics, as mass experience, included an appetite for beautiful and entertaining cultural objects. The intermingling (rather than overtaking) of classical aesthetics and mass culture is an aspect of modernity that is rarely remarked upon. As it turned out, the creation of a mass-consumed art object requires a sort of labor—labeled now "artisanal" or "craft" labor—that serves as a proxy to provide, produce, and protect these aesthetic values in the process. This is the type of work that media studies, cultural studies, culture of production theory, and other areas find themselves grappling with now. The "cultural intermediary," "cultural technician," or "expressive worker"—the names are proliferating, as are the arguments over the nature of the authority or autonomy these workers might exert. These are shifting definitions, though, and digital media tools have thrown them into question. In their construction and maintenance of authority, craft cultures draw on classical notions of universal aesthetic value and personal artistry. I see craft functioning as a kind of carrier wave for these aesthetic principles in a cultural context. The presence of craft culture—in its institutions, trade press, publications, and rituals—contributes to this durability through successive generations of technological and

institutional challenge to their authority. The result is a kind of "soft aesthetics," rules of thumb for finding balance between the competing demands of visual style, narrative continuity, and craft mastery.

It would be a mistake to attribute some "revolutionary" spirit to professional cinematography—indeed one of the fascinations of cinematography to me is how its conservative sensibility has become joined to trade unionism and the social values of the historically progressive production culture in Hollywood. It seems an error, though, to see in Hollywood cinematographers a mere facilitation of the self-same aura of classical art. Craft work in the age of mechanical reproduction lived in a contradiction, doing its part to establish the aura of the original work of art—supporting the alchemy of star quality, new and novel attractions—while also reweaving the consequences of film style, adhering to a devotion for classical values, as Benjamin might say, yet for mass purposes. Cinematographers developed a definition of mastery in the discursive spaces between the creative imperatives to "paint with light" and their service to a narrative and industrial economy built around storytelling. Cinematographers are thus required to serve several masters at once, including their own craft sensibility, literally to create a style both visible and invisible. This is a complex cultural construction.

When cinematographers met digital production, then, they found twinned threats—on one hand, an undermining of the aesthetic basis of the craft, and, on the other hand, a complication of the familiar division of labor that helped define those craft boundaries. The authority that cinematographers began to assert in the late 1990s, both to define "quality" digital cinema and to influence the design of subsequent generations of digital production tools, was based on their historical role as carriers of classical values for the industry, for their craft traditions, and for audiences.

Chapter 3: Cinematographers in Hollywood

In *The Classical Hollywood Cinema*, Bordwell describes the 1928 "Mazda tests," a trial of panchromatic film and incandescent lighting under studio conditions, as being "of capital importance in the history of Hollywood technology."[155] The tests demonstrated the central place of service firms such as Eastman Kodak and General Electric in driving research and innovation for the motion picture industry. The tests also marked a coming out of sorts for the Academy of Motion Picture Arts and Sciences (AMPAS) as coordinator of technological change in the increasingly integrated Hollywood studio system, and they allowed the Society of Motion Picture Engineers (SMPE) to stake a claim in establishing industry standards. The ASC had been meeting for almost a decade by 1928 and the honorary society for cinematographers participated in the tests as well.

To a great extent, the tests were for the benefit of the cinematographer community; the Technicians' Branch of the AMPAS had organized them because there was a sense that cinematographers were unfamiliar with the increasingly common technology of incandescent lighting. Over the course of the tests, forty cinematographers exposed 800 hours of film and prepared the resulting tens of thousands of feet of films for industry screenings. The ASC reported favorably on the Mazda tests, resolving that the new lights were well suited for the photographic fashion of the day, the gauzy "soft style" of cinematography.[156] One gets the sense from Bordwell's account that the Mazda tests were a pro forma exercise in marketing a new cinematic technology and that the ASC

[155] See David Bordwell, "The Mazda Tests of 1928," in *The Classical Hollywood Cinema*, 294-297.
[156] Bordwell, "Mazda tests," 296.

was unlikely to deliver a hostile verdict, and, even if they did, the combined weight of the service sector, studio interest, and AMPAS would have overwhelmed their dissent.

There is some evidence, though, that cinematographers were instrumental in bringing the Mazda tests to fruition. Lee Garmes, in particular, appears to have been an important player. In a 1953 profile, Arthur Miller, ASC, was quoted: "Lee Garmes was one of the greatest boosters of incandescent lighting in the business."[157] Charles Higham echoed this in his 1973 book *Hollywood Cameramen*: "Garmes revolutionized the industry, brilliantly developing his own approach by using bare Mazda bulbs to light the whole set of his historic *The Little Shepard from Kingdom Come"*.[158] If we compare this with Bordwell's description, we might ask: is it true, or even possible, that cinematographers would be unfamiliar with incandescent lighting by the late date of 1928? What was the role of cinematographer's vis-à-vis disruptive technologies in that period? What is the relationship of the cinematography to the development of classical style? What is the relationship of particular, influential cinematographers to technology in the Hollywood mode of production?

The case of the Mazda tests demonstrates well the emergence of powerful interlocking interests between manufacturers, service industries, professional associations, and craft communities in the early years of the Hollywood studio system. More recently, the transition to digital cinema has activated a similar alliance, including the AMPAS, SMPTE, and the ASC. There were, however, notable differences that I will describe below. What I would note at this point is the gap in our understanding of craft knowledge, particularly cinematography, in these negotiations, separated by over eighty years. Just as we have a poor sense of Garmes' role in the Mazda tests, the prevailing

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[157] Quoted in Hilda Black, "Forty-Five Years in Cinematography," *American Cinematographer*, January 1953, 33.
[158] Charles Higham, *Hollywood Cameramen*, (Bloomington, University of Indiana Press, 1970), 10.

image of cinematographers in the digital transition has been one of either resistance or, in a few cases, early adopters bravely pioneering the way for the rest of the craft. My goal has been to fill out this sense of cinematography as a craft culture grappling with drastic changes to its tool set, and its efforts of shape those changes while protecting traditional structures of craft-based authority.

The previous chapter described how cinematographers have made claims to certain forms of artfulness in their craft practice. This chapter introduces the relationship of cinematography to Hollywood's shifting modes of production, using existing histories of cinema, trade press accounts, and other secondary sources to provide context for cinematography as a profession and a craft tradition. In contrast with other occupation groups in the film business, the elite of cinematography, represented by the ASC, have consistently told (and re-told) their own history, largely through articles, retrospectives, and reminiscences published in *AC* under titles such as, "The Evolution of Motion Picture Lighting," and "Fifty Years-or more-of Evolving Cinema Technique." Like many trade magazines, *AC* can occasionally indulge in boosterish tones that aggrandize their craft traditions and emphasize a fraternal craft harmony, a stance that contrasts with the harsh economic and political realities of the entertainment industry. Still, in its editorial choices over the years the magazine cannot help but reveal the conditions and preoccupations of the cinematographer community, as well as the debates and controversies that have attended it in each era.[159] Here I will describe how cinematography as a profession and a

[159] Also notable, I think, is that the ASC seized on this strategy of chronicling its history very early in its tenure, elevating its own pantheon of "Aces of the Cinema" in lengthy profiles over the years, self-consciously constructing a craft identity. See, for example, H. Lyman Broening, "How it all happened: A brief review of the beginnings of the ASC," *American Cinematographer*, November 1, 1921, 13; John Leezer, ASC, "How Much Are We Worth?" *American Cinematographer*, December 15, 1921, 5; and the "Aces of the Cinema" series of profiles that ran in *American Cinematographer* through the late 1940s. For an example of the craft's historicizing of technique, see the 1969 *American Cinematographer* fifty-year anniversary issue, featuring six lengthy features on such subjects as "Evolution of the Motion Picture Lighting," and "Highlights of Lab History."

craft participated in five distinct periods of Hollywood history: the early pre-institutional era, the early studio period, the coming of sound and the integrated studio era, the rise of television, and finally, New Hollywood.

The history of cinematography, as a Hollywood profession, a craft, or cultural phenomena, remains largely unexplored. Leonard Maltin's "Survey of Hollywood Cinematography," the introduction to his *The Art of the Cinematographer*, glosses such a history from the invention of movies to 1970.[160] Others have written of the contributions of particular cinematographers, often in relation to well-known directors.[161] Histories of film style often acknowledge those contributions as well, or the particulars of specific techniques.[162] Barry Salt has written extensive accounts of the development of film style in relation to technology across the twentieth century, as well as capsule histories of cinematography.[163] Keating's *Hollywood Lighting from the Silent Era to Film Noir* (2010) is perhaps the most detailed look at the historical practice of cinematography as such, delivered within a frame of that practice's relationship to classical style. This lack of an overarching historiography of cinematography has led to a common tendency among academics to treat it as a form of work that is essentially technical and subordinate to other kinds of authority and authorship. Cinematography as an expressive practice, and cinematographers as responsible, at least in part, for the meanings and content of the images they capture really has not been broached by film studies.

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[160] See Leonard Maltin, *The Art of the Cinematographer: A Survey and Interviews with Five Masters*, (New York: Dover, 1971).

[161] See, for example, Carringer's depiction of the relationship between Toland and Welles in the production of *Citizen Kane*. Robert Carringer, *The Making of Citizen Kane* (Berkeley, University of California Press, 1985).

[162] Bordwell, Staiger, and Thompson use some examples of cinematographers at work in *The Classical Hollywood Cinema*, although focused on key institutions and the development of the dominant Hollywood style; see also Higgins for an example of close technical/aesthetic analysis of a specific technique used to achieve color on film. Scott Higgins, *Harnessing the Technicolor Rainbow: Color Design in the 1930s*, (Austin, TX: University of Texas Press, 2007).

[163] See Barry Salt, *Film Style and Technology: History and Analysis* (London: Starword, 1992) and Barry Salt, "A Very Brief History of Cinematography," *Sight and Sound* 19:4 (April 2009), 24-26.

The abbreviated history I write here, while hardly redressing this gap, advances my argument that cinematography, from its emergence as a "technical" position in the detailed sub-division of labor in the Hollywood studio system to its current, somewhat contested, position in the age of digitalization, can be seen following a pendulum-like process of negotiating technology and style, as the profession moves away from the mundane problems of simply capturing images toward using photographic technologies to expressive ends, only to swing back toward technical preoccupations as they encounter a new generation of technological challenges, then beginning again to move toward the expressive possibilities. This process is constrained and given shape by craft-based discourses of convention and virtuosity. The fact that cinematographers undertake this work in complex networks of authority and collaboration, both "above" and "below" them in the hierarchies of institutional power, shouldn't be allowed to obscure what I believe is a prominent place in establishing and mediating the emergent relationship of technology and style in cinema.

CINEMATOGRAPHY IN THE PRE-INSTITUTIONAL ERA

In the period of cinema's invention and initial attempts to exploit the new technology, roughly the era before 1907, most films were made under the supervision of single person. Staiger has termed this mode of production the "cameraman system," a "particularly unified craft situation" in which the cameraman, as a skilled artisan and craftsperson, could conceive and execute the entire process of producing a motion picture.[164]

For Staiger, this is an example of the social division of labor applied in an industry that was not yet consumed by a need for mass production and standards of quality that would require a detailed division of labor. The pre-institutional period holds

[164] Bordwell, Staiger, and Thompson, 116

an especially mythical place for cinematographers, when cameramen (not yet "cinematographers") controlled their own equipment and their artistic contribution was not qualified by collaboration. The singular figure for cinematographers in this regard is probably Edwin S. Porter, who, while working for Thomas Edison, made the seminal examples of early motion picture narrative, *The Great Train Robbery* and *Life of an American Fireman* (both in 1903). *AC*'s claiming of Porter as a cinematographer shows how the craft deploys the blurred authority between director and cinematographer in the pre-institutional period as a kind of origin story.[165] In 1953, Arthur Miller, ASC, is quoted in *AC*:

> The cameramen were the real filmmakers, in fact, in those days, the movie was the cameraman. Not only did we do the actual shooting, we also were our own laboratory technician. From the beginning, what appeared on the screen was the sole responsibility of the cameraman.[166]

This sense of a craftsperson's relationship to his tools, the significance of owning or controlling the apparatus (not just camera, but laboratory as well) and defending it from outsiders dates from this earliest period. As Miller elaborates:

> In the early days of movies, the cameraman invested everything he earned in his work and equipment, he bought his own camera, lenses, and accessories… frequently what made one fellow better than another was his private collection of lenses.[167]

Cameramen emerged from many walks of life, but most had been inventors and technicians who had occasion to get to know the technology, or photographers interested in the new possibilities of "moving" photography.

The figure of the "director-cameraman" lingers in the discourses of production culture, not just for cinematographers, but in the "hyphenated" filmmakers of various independent strains, such as Robert Rodriguez, Stephen Soderbergh, and Mike Figgis

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[165] G. Turner, "A Tradition of Innovation." *American Cinematographer*, August 1994, 94.
[166] Black, 31.
[167] Ibid., 32.

(more on this below) who write, direct, operate cameras, and fill multiple roles in productions that bear their names. One hundred years after the emergence of the "unified craft situation" of the pre-institutional period, digital technologies presented for many filmmakers an opportunity to approximate (some in practice, others in name only) that less complicated structure of authority as well.

CINEMATOGRAPHY UNDER THE DIRECTOR UNIT AND CENTRAL PRODUCER SYSTEMS

After 1909, the detailed division of labor began to take hold as production duties split, at first, into director/cameraman tandems. In this system of production, one individual staged the action while another person photographed it.[168] This model was transplanted from theater where the director is in overall charge of the production and the final arbiter for almost any decision. (In cinema, the terms "producer" and "director" were interchangeable at this time.) The cameraman still held significant responsibilities, though, as camera technology was cumbersome and unreliable and many directors were not technically adept. As Staiger writes:

> The cameraman, almost invariably, made several important decisions: the sufficiency of light, the photographic acceptability of a take, and the quality of the negatives he or an assistant developed and printed.[169]

The detailed division of labor accelerated quickly, so that after 1909 production was departmentalizing into discrete job functions such as script, direction, art, camera, wardrobe, laboratory, etc. Firms hired multiple "director-units," each a self-sustaining production team, in order to meet growing demand from exhibitors for film productions. For cinematographers, the director/cameraman tandem still represents the central, most essential relationship in production, a perception that may date from this early period

[168] Bordwell, Staiger, and Thompson, 117.
[169] Ibid., 118.

when storied teams, such as D.W. Griffith and Billy Bitzer, defined the "director-unit" system. *AC* periodically reaffirms this subdivision of labor with articles such as "A Director Who Recognizes the Importance of Cinematographers," "Can't Combine Jobs of Director and Cameraman, Says Garmes," "Can One Man Do it Alone?," up until the present day.[170]

Further departmentalization, though, represented a fall from grace for cinematographers. As Staiger points out, the supply of skilled cameramen was soon exhausted in Hollywood, especially since the job entailed an unusual combination of artistic and technical acumen. Directors and producers went looking for cameramen, recruiting some from the ranks of still photographers, but mostly turning to film laboratories. *AC* wrote of this period: "Producers looked at the situation from a practical viewpoint, ignored art, and promoted enterprising laboratory workers to be the role of cameramen. This at least helped guarantee a well exposed negative."[171] Producers wanted guarantees, and what a cameraman should guarantee, especially with the technology in an infant stage, was a useable negative. The responsibility to provide the financiers of the film with their first (and sometimes only) tangible asset, a quality negative, has remained a key aspect of cinematography's craft culture.

Cameramen began to form clubs and associations in the mid-1910s. Two of these, the New York-based Cinema Camera Club and the Los Angeles-based Static Club,[172] merged in 1917 and in 1919 renamed their conjoined groups the American Society of

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[170] "Can't Combine Jobs of Director and Cameraman, Says Garmes" *American Cinematographer*, April 1939, 157-58; Ezra Goodman, "A Director Who Recognizes the Importance of Cinematographers." *American Cinematographer*, July 1945; Truman Smith, "Can One Man Do It Alone?" *American Cinematographer*, November 1965, 716.

[171] Joseph Noble, "Development of the Cinematographic Art." *American Cinematographer*, January 1947, 10-27.

[172] So named for one of the foremost irritations for cameramen of the time: static electricity building up in the camera's film gate. When the static discharged it left "lightning" traces on the film frame. There was no way to know for certain if your camera was generating static until the film was processed, and cameramen developed their own proprietary tricks for preventing it.

Cinematographers. The club adopted the motto "Loyalty, Progress, Artistry." This motto, especially the call to "artistry," was a reminder of the craft's origins as, in Arthur Miller's words, "real filmmakers." The increasing institutionalization of cinema was exposing a tension, a need to strike a balance between the primarily technical responsibilities of the job (exposure) and those of art (expression).

My reading of the back issues of *AC* and memoirs of cinematographers suggests that this tension between exposure and expression is a kind of Sisyphean myth—a trope of their cultural narration in which every generation surmounts the latest challenges to the sacred craft traditions.[173] It first emerged in this early period, contemporaneous and parallel with their move from a cameraman system of production, through the director system and into the central producer system that presaged the studio era, embedding them in an increasingly constrictive hierarchy of film production and specialization. At the same time that their authority was becoming more bound into a responsibility to provide a quality "exposure," the craft was discovering the possibilities of lighting that was "expressive" of mood, character, and genre.

In this early period film stocks were unresponsive, cameras were fussy, and electric lighting was just beginning to emerge. Most films were shot using sunlight, either on location or in glass-roofed studios, using diffusion curtains to control the intensity of the daylight. The goal into the 1910s was a "uniform, drenching of the stage with light."[174] Soon, cinematographers began to borrow strong artificial light sources from other arenas such as photography, stage lighting, and street lighting to vary the character of light, as well as lighting for effect, for glamour, and to fit emerging genre

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[173] The very practice of writing memoirs betrays something of the craft's self-regard. Given the peripatetic lifestyle of many cinematographers, though, along with their aesthetic sensibilities and the mid-century construction of a certain rugged, world-weary masculinity, it probably isn't surprising that many of these memoirs take on a picaresque quality, the globe-trotting artist at work.

[174] "The Evolution of Motion Picture Lighting" *American Cinematographer* (January 1969), 94.

conventions.[175] As Kristen Thompson has described, the adaptation of Cooper-Hewitt mercury-vapor lights from industry and electric Carbon-Arc lamps from the stage were key developments that allowed more flexibility and efficiency in production.[176] The significance of these developments to cinematographers was less that of exposure, a problem they felt they had well in hand, and more of expressive possibility: "When daylight stages began to disappear, the art and science of motion picture lighting came into being."[177]

Stronger lighting instruments adopted and refined after 1912 allowed new techniques: a greater depth of field, larger sets, and finer modeling of stars' faces. Staiger has written that in this period cinematographers began to invoke what she calls "classical goals" of beauty, spectacle, and technical virtuosity in describing their work.[178] This seems an accurate description of the how cinematographers talked about their craft, although at a level of generality I would like to fill in somewhat. The standard of "beauty" most commonly referenced was the "soft style," often associated with Bitzer and Griffith and exemplified by the film *Broken Blossoms* (1919). The film tells the story of a doomed relationship between a Chinese Buddhist missionary in London and a street waif with an abusive, racist father. According to *AC*, *Broken Blossoms* demonstrated the possibilities of using light to support the narrative by creating a poetic, foggy London atmosphere and using diffuse lighting on star Lillian Gish for a romantic, Victorian look.[179] As Kristin Thompson has noted, while Bitzer and Griffith are credited with

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[175] See Keating, *Hollywood Lighting*, especially "Chapter 1: Mechanics or Artists?"15-29 for a discussion of cinematographers' early conceptions of their work as artful.
[176] Bordwell, Staiger, and Thompson, 273.
[177] "The Evolution of Motion Picture Lighting," 95.
[178] Bordwell, Staiger, and Thompson, 255.
[179] In other articles, *AC* credits earlier "lighting for effect" to a host of others, including Cecile B. Mille and future ASC member Alvin Wyckoff on *The Virginian* (1914). Primacy is of less interest to me than cinematographers' move from technical concerns to aesthetics, which clearly happens fairly early in their history. See "The Evolution of Motion Picture Lighting," 94-177.

popularizing the Pictorialist style, it had been a topic of craft discourse for the decade preceding (as well as a dominant visual style in photography and academic art).[180]

If the "soft style" was emerging as dominant in this period, cinematographers, in their own historicizing, also note that cinematographers were stealing from Rembrandt by 1916 and, indeed, owed too much to these more high contrast precedents: "When an [early] cameraman attempted to bring art into his work, he did so by slavish imitation of a combination of the classic forms of painting and the work of portrait photographers."[181] Looking back from the vantage point of 1969, what cinematographers remembered of the period between World War I and the coming of sound was a complex process negotiating style. Soft style was a piece of this, as was pioneering photography steeped in a "harsh realism" as in John Ford's *The Iron Horse* (1924) and Erich von Stroheim's *Greed* (1924), both shot on location and utilizing stark, bright sunlight. The exotic locations and natural light of the documentaries of Robert Flaherty, an explorer turned director/cinematographer (a throwback), inspired cinematographers as well. Foreign influences, such as the German F.W. Murnau's fluid use of camera movement and subjective camera is also cited as an influence by cinematographers.

By the end of the 1920s, cinematographers were, by and large, contract employees of the studios, fully enmeshed in what Staiger calls the "producer-unit" system of production. Being "under contract" meant many different things, of course, and some cinematographers enjoyed greater rewards and mobility that others. Mobility, for a cinematographer, usually meant the "freedom" to follow a star or director to another studio for an assignment, with the permission of a central producer or studio head. It was in this context that sound was thrust upon cinematographers.

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[180] Bordwell, Staiger, and Thompson, 292.
[181] Noble, 26.

CINEMATOGRAPHERS, THE STUDIO ERA AND THE COMING OF SOUND.

There is little argument among cinematographers that the coming of sound represented a nadir for the craft. As the 1969 retrospective in *AC* stated: "this period of technical transition was a nightmare for the cinematographer."[182] Charles Higham called it a "temporary lapse in the art of cinematography."[183] Sound film, as Douglas Gomery has written, was not a sudden occurrence but rather represented the culmination of years of experimentation, industrial coordination, and studio maneuvering.[184] Nonetheless, cinematographers seemed astonished by their studio masters' willingness to compromise cinematographic quality for the novelty of sound. These compromises are legendary now: the camera immobilized inside of stifling, soundproof booths, dim lighting, stilted compositions, the move to multiple cameras (and thus, from the cinematographer's point of view, a return to even, non-expressive lighting).[185]

The period 1927-1935 was also, however, a fertile period of innovation for cinematographers. The Mazda tests, of course, took place in 1928 and led to the widespread adoption of panchromatic film and incandescent light.[186] Camera blimps emerged quickly in response to sound, as well as camera dollies and cranes that allowed the camera to move with a new level of fluidity. Cinematographers used panchromatic stocks and wide lenses to develop new expressive lighting effects, such as James Wong Howe's use of deep focus and low angles to inspire claustrophobia in an early talkie, *Transatlantic* (1931).[187] Technicolor's efforts to establish a color film process were

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[182] "Fifty Years - or More -," 106.
[183] Higham, 11.
[184] Douglas Gomery, "The Coming of Sound: Technological Change in the American Film Industry" in Film Sound: Theory and Practice. J. B. a. E. Weis. (New York, Columbia University Press, 1985).
[185] See, for example, Black, 34, "Fifty Years - or More -," 106.
[186] As Bordwell has described, the Mazda tests were a trial run for the industry-wide standardization of sound after 1928, which required a broad coordination of rival studios, competing technological systems, service firms, and trade organizations.
[187] Bordwell, Staiger, and Thompson, 344; also mentioned in Higham, 11.

ongoing, and Walt Disney showcased their improved, three-strip color process in his 1932 short, *Flowers and Trees*.[188] In short, even though the period is often described as a low point for cinematography, *AC* could also write: "this entire period is characterized by inventions of equipment and refinements of technique rather than any pictorial style of its own."[189] In other words, a period of technological turmoil, while fruitful in some ways, began by hindering the craft's ability to develop signature styles and looks (as it had with the 1920s "soft style"). In time, though, it could lead to aesthetic innovations of its own.

What is especially characteristic of cinematographers and the coming of sound is their resistance to producers' infatuation with technological novelty and precedence being given to the new "sound department." *AC* captures this tone in the 1969 review:

> The cinematographer…fought his temporarily futile battle because the importance of the engineering minded technicians who had been brought into the industry to operate the sound equipment enabled them to reduce the art of cinematography to a mere mechanical function in order that they might achieve a result in their own field.[190]

This statement, with little revision, could be transferred verbatim into the late 1990s volleys over the "death of film," digital cinematography, and the presumably vestigial role of the cinematographer in a post-film world.

Cinematographers found themselves locked in a similar struggle with the emergence of Technicolor, this time with producers and the "color consultants" that Technicolor required producers to hire:

> Again the cinematographer was faced with technical restrictions. Color required higher levels of illumination than black and white and the latitude of the process was more narrow. He was told by some engineers that color itself would provide

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188 "Color in the Motion Picture." *American Cinematographer*, January 1969, 171.
189 Noble, 26.
190 "The Evolution of Motion Picture Lighting," 96.

> contrasts, depth, and form, and that all he needed to worry about was uniform intensity of illumination, sufficient for adequate exposure.[191]

Cinematographers complained that Technicolor's engineers were too conservative, insisting on flat, white lighting: As Higgins has written, the studios brought in color designers on early Technicolor productions who worked to craft an aesthetic relationship between color and the Hollywood narrative form. Those individuals presented a unified sense of color cinematography in the trade press and shaped the adoption of color as an expressive device. From Higgins' account, the work of the cinematographer in early Technicolor was marginalized in the early 1930s, at least. To cinematographers, then, the persistence of black and white photography and the studio's reluctance to adopt Technicolor more widely was seen as good sense.[192] Although Technicolor received ample coverage in *AC*, there were numerous smug stories of cinematographers besting the color consultants. In his 1983 memoir, Joseph Walker, ASC, wrote of shooting *The Jolson Story* (1946):

> Then I noticed that when [Larry Parks, playing Jolson] stood near an incandescent light, his blackface looked more natural. Over the loud protests of a Technicolor consultant, I tried an incandescent spotlight on Larry's face…that slight yellow glow, barely noticeable, did the trick.[193]

Such stories abound, and clearly many are apocryphal. After all, Technicolor has ASC members on its payroll, such as Ray Rennahan, ASC, who played a key role in demonstrating Technicolor processes on films such as *La Cucaracha* (short), *Becky Sharp* (1935), and *Gone with the Wind* (1939).[194]

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[191] "The Evolution of Motion Picture Lighting," 107. In this article, as in many articles of the period in *AC*, a generic, imagined cinematographer is used as the primary subject of the article.
[192] Some explanations for the studios' resistance to Technicolor include high cost: a color film could be expected to cost as much as 30% more than black and white; also the lack of compelling audience demand for color and the resistance of the studio apparatus to cede the necessary level of control to Technicolor, which had monopolized its equipment and process. See Higgins, *Harnessing the Technicolor Rainbow*.
[193] Joseph Walker, *The Light on Her Face*, 252.
[194] Walter Greene, "30 Years of Technicolor," *American Cinematographer* (November 1947), 410. Also, see "Color in the Motion Picture," 171.

In the craft culture of cinematography, *Gone with the Wind* marked a welcome return to expressive lighting:

> The cinematographer, freed somewhat of the necessity to simply get enough light on the subject for color photography, turned his attention more than ever toward lighting for mood and dramatic effect in color and this called for a clean, hard source that could be used at a relatively long distance from the subject and still produce the much to be desired "single shadow" effect."[195]

Within the studio system, then, cinematographers found themselves betwixt the problems of exposure and expression. What is notable about cinematographers' work in the new mode, though, is a much clearer positioning of cinematography in opposition to, on one hand, the "engineers" who would reduce cinematographers to simply exposing the film in accordance with a set of pre-determined criteria, and on the other hand, the producers, for whom the cinematographer was foremost a guardian of the negative, not a member of the core creative team. This is not to say that cinematographers were obstructionists, indeed they are usually accommodating of the producer who was, after all, the person who hired (and fired) them. Still, this dynamic is part of what defined their work, protecting cinematography as a craft, from producers, technicians, manufacturers, or anyone who would reduce it to merely capturing an image.

This balancing act continued through the mid-century. The worldwide economic crisis during World War II, not to mention the loss of the global market for their products, led the studios to ask the trade-crafts for ideas about how to reduce expenses. The response of the ASC is a revealing expression of cinematographers' two-sided commitment to craft and industry. They proposed: shooting shorter scripts, editing in the camera, hiring the cinematographer earlier for better planning, less wasteful blocking of actors by directors, hiring swing crews to prepare lighting, and shooting day for night. In short, "the remedy is simple: closer coordination between the director, cinematographer,

[195] "The Evolution of Movie Lighting," 108.

and editor."[196] The author was careful to note that each cinematographer would have his own solutions to certain problems. For instance, when shooting "day-for-night":

> Deciding which is which is something that demands the attention of the DP—not merely of a cameraman, but of the specific individual who is going to photograph the picture, for each cinematographer has his own approach to the problem of night effects.[197]

Reduced resources in wartime led to stylistic innovations, as well. Cameramen went to war and returned with new ideas. "It was inevitable that the documentary style of photography they adopted should be duplicated in theatrical films, especially those that called for realism of milieu."[198] *AC* traced the influence of documentary films such as *The Battle of Midway* (1942) and *The True Glory* (1945) through post-war movies *The Lost Weekend* (1945) and *The Naked City* (1947) to the "neo-realistic style of semi-documentary photography" of 1950s dramas *On the Waterfront* (1954) and *The Wild One* (1954), among others.[199] The rise in location shooting, sequence shots (combining long takes and deep space), semi-documentary techniques, and high contrast photography were a few of the new techniques *AC* attributed to adventurous filmmakers returning from the war.

CINEMATOGRAPHY IN THE 1950S

The 1950s saw the breakup of the integrated studio system following the Paramount decrees and the emergence of television as a competing medium for mass visual entertainment. This decade represented a moment of profound uncertainty for cinematographers. The general response of the ASC, at least as articulated through *AC*, was a stronger emphasis on professionalism. This is the era when *AC* begins publishing

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[196] "Cinematographers Show How to Achieve Production Economics." *American Cinematographer*. (August 1940), 361.
[197] Ibid.
[198] "Fifty Years or More," 133.
[199] Ibid.

historical articles and the number of articles about professional technique rose sharply. One article, "This is the Director of Photography," promoted an informative short film titled "The Cinematographer" produced by AMPAS and the ASC.[200] Initial articles on the subject of television cinematographers struck an equanimous note, as in the 1945 article "Where Will You Fit in Television?" which assumes that cinematographers will play a prominent role in forming the new medium, despite its obvious "deficiencies" as an expressive medium.[201] The author indulged in some light mockery of an unnamed television director, who opined that television was an entirely new medium different from either radio or motion pictures. The cinematographer stated: "…experience has taught me that a well-equipped technician from motion pictures can take over a similar job in television with ease."[202]

Articles about amateur cinematography, which had been a regular feature since the early 1930s, became scarce. This suggests a felt need for a more professional profile for cinematographers after the coming of television, a sense, perhaps, that any nurturing of an amateur cadre within the craft could confuse an already unstable sense of authority. In periods of technological disruption, policing the lines between professional and amateur becomes more critical for a craft community. Lacking an agreed mechanism of certification for its "professional" practice, and invested in an amorphous sense of aesthetic value to demonstrate craft mastery, cinematographers found craft boundaries were porous to claims of membership. With the emergence of digital production techniques, especially "pro-sumer" grade cameras and computer-based color correction and editing, cinematographers again found themselves invested in these distinctions,

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[200] Warren Garin. "This is the Director of Photography." *American Cinematographer* (November 1949), 401.
[201] Irving Browning. "Where Will You Fit in Television." *American Cinematographer* (March 1945), 80.
[202] Browning, 90.

often leveling charges of "amateurism" at works created by established cinematographers, but using digital technology.

Eventually, television's voracious appetite for material would be a windfall of sorts for cinematographers, even if it required significantly reduced circumstances:

> Far from hobbling the cinematographer (as had been feared) the films made especially for the new electronic medium opened up to him a whole new field of expression. Those who adapted quickly and easily to the special demands of television encountered a few limitations, but, on the whole, a surprising new area of flexibility and experimentation.[203]

A 1965 article in *AC* argued that cinematographers should be learning lessons from the more systematic and centralized production methods of studio television. It looked to a future when videotape would force film from the production chain, unless film, film cameras, and the control systems of film began to mimic television.

> It still isn't too late. If the motion picture industry is willing to make the necessary expenditures, the brain power is already available within the talent pool of artists and artisans now in the industry, who are ready and willing—even anxious—to make this dream a reality.[204]

Some cinematographers would prove pivotal in forming the links between technology and style within television. Karl Freund, for example, designed the efficient three-camera system used by Desilu to film the sitcom *I Love Lucy* in front of a live studio audience.[205]

For Hollywood's veteran cameramen, though, the 1950s looked to be an unsettled decade. Some remained under contract with the studios, which divested from their theater chains but retained their production facilities. The traditional standards of cinematography were buffeted by a storm of new technologies and gimmicks inspired by the prevailing sense of uncertainty. Producers and technicians had new justifications for

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[203] "Fifty Years - or More -," 142.
[204] Hank Stockert, "Is Filming Technology Losing Ground." *American Cinematographer* (April 1965), 226.
[205] Thomas Schatz. "Desilu, I Love Lucy, and the Rise of Network TV." in *Making Television: Authorship and the Production Process*, Ed. Robert Thompson and Gary Burns (New York, Praeger, 1990).

undermining the authority of cinematographers: new film stocks, lens, widescreen formats, and gimmicks like 3D, leading to what Charles Higham called "a period of distortion, fuzziness, and shallowness."[206]

One spot of good news was color cinematography. Technicolor and its armies of technicians were supplanted by Eastman Kodak's "monopack," or single-strip color film stock, which could be used in any standard 35mm camera. Kodak's color stock was not as saturated as Technicolor and it also faded quickly. Nonetheless, cinematographers' preferred this workflow, less complicated by outside experts. The proportion of color to black and white films released by the studios jumped from less than half to near parity by the mid-1950s as color became seen as a way to differentiate motion pictures from television.[207]

In response to television, the studios also developed wide-screen formats for cinema. Cinematographers were among those that developed competing systems for wide-screen presentation.[208] Most wide-screen processes emerged from small firms or were initiated by the studios, but all faced the problem of distributing their method into ranks of exhibitors. Once the production sector had established the principal competing wide screen alternatives, though, the industry's service firms and craft workers worked to

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[206] Higham. 14.

[207] Brad Chisolm, "Red, Blue, and Lots of Green: The Impact of Color Television on Feature Film Production," in *Hollywood in the Age of Television*, Tino Balio, ed. (Boston: Unwin Hyman, 1990), 224.

[208] R Patterson, "Highlights from the History of Motion Picture Formats." *American Cinematographer* (January 1973), 84. Cinerama, for instance, was invented by Fred Waller, ASC, for an attraction at the 1939 World's Fair in New York, retooled for training pilots in flight simulators during World War II, and retooled again for wide screen film production. Cinerama recorded images on three interlocked, adjacent cameras and then projected the image back with interlocked projectors, yielding an enormous image that was displayed on a 146-degree screen. A competing system was the Todd AO format, which used a single strip of 65mm film. Paramount studios championed Vistavision, which used standard 35mm film stock, but exposed the image horizontally to allow wide-screen recording. Twentieth Century-Fox entered the wide screen fray by purchasing the option to Henri Chretien's anamorphic process, a concept that actually dated from the 19th century. Anamorphic, renamed CinemaScope by Twentieth Century-Fox, uses a special lens to "squeeze" an image horizontally, and allows it to be captured on standard 35mm film. Upon projection, an image is "un-squeezed" by a similar lens and appears normal to the audience.

adapt their methods. How cinematographers were involved in working out the details of wide-screen technology and style has never been systematically described, but it is worth noting that wide-screen was by and large described as a puzzle to be cracked. For instance, although cinematographers welcomed the ability to shoot remarkable panoramas and landscapes, anamorphic lenses made it impossible to shoot deep focus, a standard technique. The new wide-screen processes called for new compositional techniques, as well as changes to lighting methods, ways to hold sharp focus, and minimizing areas of distortion. Again cinematographers saw themselves responding to the desires of producers and the technicians that found the technological routes to those desires.

CINEMATOGRAPHERS AND GENERATIONAL TRANSITIONS

One of the more remarkable aspects of cinematography is the longevity of the careers of its practitioners. In contrast to many creative jobs in the film industry, careers in cinematography that cover thirty, forty, or fifty years are not uncommon, and, as we have seen, those careers spanned years of turmoil and stylistic change. Lee Garmes, who has been mentioned in several contexts here, began his career as Dorothy Gish's cameraman in 1919 and shot for nearly every studio in a career that spanned almost 50 years.[210] One can hardly imagine a greater (or more ironic) span than that of William Daniels, whose first credited work was *Foolish Wives* (1922), directed by Erich von Stroheim. One of his final projects was *Valley of the Dolls* (1970). Robert Surtees started his career shooting programmers for MGM in the early 1940s and won an Oscar for color cinematography for *King Solomon's Mines* (1950). Later, he photographed New

[210] According to the Internet Movie Database, his last feature credit was *How to Save Your Life (and Ruin Your Marriage* (1968), a comedy starring Dean Martin and Stella Stevens.

Hollywood touchstones like *The Graduate* (1969) and was nominated for Academy Awards for *The Last Picture Show* (1971) and *The Sting* (1973).

Cinematography is one of the few crafts in the industry that speaks of itself directly in terms of "generations" and generational lineage. Burnett Guffey—the man who photographed *Bonnie and Clyde* (1967) also shot *From Here to Eternity* (1953). Guffey's uncredited collaborator on *From Here to Eternity*, Floyd Crosby, had photographed the early, influential South Sea docu-drama *Tabu* (1931), and worked on *Little Shepherd of Kingdom Come* (1928), the film on which Lee Garmes demonstrated the virtues of incandescent light. The connection between today's cinematographers and the founders of the craft is often a matter of a few generations, an aspect of the field that is invoked repeatedly in their trade press and celebrations of the profession.

By the late 1940s, many of the older studio cameramen found themselves working in a dramatically restructured industry and some began easing into retirement. Studio contracts were a thing of the past and craft workers moved into freelancing, or taking jobs from all comers. The post-studio period inaugurated the "package-unit" system of production, in which long-term relationships between studios and their labor force were dissolved, but the detailed division of labor, based now on union-agreements and specialized technical knowledge, remained largely intact.[211] Indeed, experienced cinematographers were in the unfamiliar position of being able to negotiate their compensation on a project-by-project basis, wielding new levels of autonomy, and being hired for their idiosyncratic skills and talents.[212]

Veteran cinematographers were in an excellent position to take advantage of Hollywood's newest programming strategy, the turn to "blockbuster" pictures. The move

[211] Bordwell, Staiger, and Thompson, 330.
[212] Ibid., 334.

toward these big budget spectacles, as Schatz has written, began in the mid-1950s, continued through the 1960s recession, and then became the engine for Hollywood's economic recovery in the mid-1970s.[213] Studios and producers were placing larger and larger bets on blockbusters; the craft knowledge of experienced studio-era cinematographers represented an island of stability in that high stakes game. *The Sound of Music* (1965) was photographed by Ted McCord, who got his start with William Desmond Taylor's *Sacred and Profane Love* in 1921. Freddie Young, who shot *Lawrence of Arabia* (1962), *Lord Jim* (1965), and other sprawling mid-1960s international productions, had been a cinematographer since the mid-1920s. Robert Surtees photographed *Ben-Hur* (1959) and *Doctor Doolittle* (1967, the same year he photographed *The Graduate*.). Many of these assignments reflected close relationships between cinematographers and highly experienced directors such as David Lean, Richard Fleischer, and Robert Wise. Clearly, though, the craft knowledge of the old guard was an asset the studios were loath to give up. If cinematographers had been firmly "below" the line since the 1910s, after 1955 they found themselves inching into that gray area that separates the creative core of "above the line" filmmakers from the technical staff—without crossing, it must be said, into that zone where their interest is enough to initiate or ensure financing for a project.

This negotiable level of authority—while it varies from individual to individual and project to project—has prevailed since the advent of the package-unit system. Through the 1960s, cinematography opened up to a new generation of cameramen and stylistic experiments. The art cinema of this period is typically described as a product of Hollywood ingesting stylistic innovations from the 1950s, such as the looks of Direct Cinema and the French New Wave. Unfortunately, although the most active New Wave

[213] See Thomas Schatz. "The New Hollywood," in *Film Theory Goes to the Movies*. Jim Collins, and Ava Preacher Collins, eds. (New York, Routledge, 1993).

cinematographers, Raoul Coutard and Henri Decae, are lionized in Europe, their influence is less noted in American histories of art cinema. The new generation of American cinematographers started their careers in a more fractured industry than their elders, often beginning by shooting television movies or television series, and this younger generation proved eager to test both avant garde movie photography and new technologies. They had a particular affection for technologies originally intended for amateur filmmaking, such as 16mm and other narrow gauge formats and smaller, lightweight lighting instruments designed for use with house current.

As late as 1969, *AC* was expressing discomfort with the "frenetic style" of the new art cinema movement, of directors and cinematographers indulging in creating "instant film grammar" with improvisational camera work, undisciplined pans and zooms, shooting into lights and the sun, wild handheld shots, and the like.[214] As Charles Higham exclaimed: "the new generation of cameramen…prefer an informal realism even more radical than Wong Howe."[215] Note the perceived tension between the emerging "undisciplined," "informal" styles and professional cinematography. As Bordwell has noted, from 1960 forward, Hollywood and international cinema alike featured quicker editing, including disorienting techniques such as jump cuts and concentration cuts, tighter compositions, more extreme lens choices, and more aggressive camera moves. He attributes these adjustments to the dominant film style to several sources: competitive pressure from television (as well as the need to shoot *for* eventual broadcast), more rigorous pre-visualization, new technologies such as the Steadicam™ and video- and computer-based editing, tighter production schedules and budgets, multiple camera shooting, and innovative directors and cultural exchange.[216] A prolonged discussion of

[214] "Fifty Years - or More -," 148.
[215] Higham, 17.
[216] Bordwell, *The Way Hollywood Tells It*, 156.

the sources of what Bordwell terms "intensified continuity" is outside my scope here, but it bears remembering that this turn toward stylistic innovation came at a time that cinematography was undergoing a generational shift, as well as an influx of talent from Europe, at the same time the Hollywood studios were weathering the economic crisis of the late 1960s and early 1970s.[217]

CINEMATOGRAPHERS IN NEW HOLLYWOOD.

By the mid-1970s, Schatz writes, Hollywood entered its "first period of sustained economic vitality and industry stability since the classical era," enlivened by the new breed of genre-fueled blockbusters, saturation television advertising, and other marketing advances.[218] The generational transition within cinematography was almost complete. The new generation of cinematographers included film school graduates such as Conrad Hall and Allen Daviau, and expatriates such as Lazslo Kovacs, Vilmos Zsigmond, and Vittorio Storaro. This generation of cinematographers was the first to benefit from the critical discussion of cinema and the elevation of directors to star-status. The glow from famous directors reflected onto cinematographers and some emerged from the craft's historical anonymity.

The explosion of new tools in the late 1960s and 1970s might also be seen as related to the generational shift. With the exception of the "film vs. tape" debates that animated *AC* briefly in the early 1970s, this was a generation for whom color negative film was a stable technological base on which the craft could experiment with new devices and practices. New film stocks, reflex viewfinders, Steadicam™, video taps, and advanced special effects photography all emerged in this period. As it had been in the

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[217] On Hollywood's economic crisis, see Thomas Schatz. "The New Hollywood," in *Film Theory Goes to the Movies*. Jim Collins, and Ava Preacher Collins, eds. (New York, Routledge, 1993) and Douglas Gomery, "The American Film Industry of the 1970s: Stasis in the New Hollywood." Wide Angle 5:4 (1983): 52-59.

[218] Schatz. "The New Hollywood," 9.

past, new technology was a way for the new breed of cinematographers to differentiate themselves from their colleagues. Reputations could be built by championing new techniques. The persistent anxiety about exposure and expression faded into the background.

After the mid-1970s, negative costs and marketing costs continued to rise and reliable cinematography remained a kind of insurance policy for studios and producers. The rise of the American independent movement in 1980s marked the entry of marginal filmmakers—women and African Americans—into the filmmaking community.[219] The technical base of 35mm film remained a specialized area of knowledge, though, and cinematography remained overwhelming a closed profession, male and predominantly Caucasian at the highest levels. Directors' reliance on a relatively small cadre of established cinematographers as creative collaborators, and producers' reliance on them as technical experts, constructed a barrier to entering the craft that looked, if anything, higher than the old barriers of union rosters and studio gates. In the New Hollywood it was a rare producer who would trust an untried cinematographer.

In the 1980s, conglomeration led to synergistic strategies in which global corporations tried to merge high-concept blockbusters with other media and technology holdings to create franchises properties. Cinematographers found themselves working on motion pictures that were one element within a product line, although, often enough, the flagship product. Their work increasingly became part of larger image-making processes in which their photography formed the basis for a "look" extending through marketing, merchandising, video games, and beyond.

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[219] On the emergence of the American Independent movement, see Geoff King, *American Independent Cinema*, (New York: Macmillan, 2005), John Pierson, *Spike, Mike, Slackers, & Dykes: A guided tour across a decade of American Independent Cinema*. (New York: Miramax, 1995), and Greg Merritt, *Celluloid Mavericks: A History of American Independent Cinema*, (New York: Thunder's Mouth, 2000).

CINEMATOGRAPHERS AND DIGITAL CINEMA

The prospects of digital imaging and digital techniques emerged first in Hollywood during the 1980s. Computer-generated imagery (CGI) and special effects in movies such as *Tron* (1982), *The Last Starfighter* (1984), and *Young Sherlock Holmes* (1985) pointed toward the world- and character-construction potential of digital animation. In this same period, members of Lucasfilm's computer animation division created *The Adventures of Andre and Wally B* (1984), and later (after spinning off as Pixar), *Luxo, Jr.* (1986), two of the first full-CGI animated shorts. These two shorts were praised for their appealing character design and advanced "squash and stretch" programmable objects,[220] but also for utilizing cinematographic effects such as motion blur and, in *Luxo, Jr.,* the dynamic play of shadows and light.[221] In a CG-world, obviously, such effects have to be specified, or coded, in the computer language that generates the frames; the Pixar team created a specialized component of their RenderMan animation software to realize those effects. This probably represents the first computer-based practice of cinematography, with lighting and shadows cast, as it were, from scratch. In these animations, though, certain core principles of cinematography are upheld, such as motivation, continuity, and effect-lighting. In the eyes of commentators, the real breakthrough for these shorts was the realization of identification and emotion for animated "inanimate" objects, achieved through narrative and visual style. As such, they seem like a validation of cinematographers' numerous defenses of their craft's aesthetic values as foundational to the expressive, affective possibilities of narrative cinema.

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[220] In previous CGI creations, surfaces and objects were rigid and could not interact realistically.

[221] For more on the development of *Andre and Wally B* and *Luxo, Jr.*, see Michael Rubin, *DroidMaker: George Lucas and the Digital Revolution* (Gainsville, FL: Triad, 2006), 358-374, 414, and 457 and David A. Price, *The Pixar Touch: The Making of a Company* (New York: Knopf, 2009), 90.

Multi-track digital audio recording and editing emerged in the late 1980s as did advanced digital graphics and compositing systems such as Quantel's "Paintbox" and "Henry" and Discreet Logic's "Flame." (Such systems allowed for the creation and animation of graphical objects and their combination with video-based images.) These became a prominent part of video-based workflows for television commercials, music videos, and the like. Computer-based editing systems such as Avid (1988) and Lightworks (1991) were adopted by television production and by the mid-1990s were ubiquitous in feature film production as well.[222] In the U.S., the FCC was preparing rules that would move television from its analog technical foundations (NTSC) to digital broadcasting. By mid-1990s, then, principal photography, distribution, and exhibition of feature films were quickly becoming an island of 35mm-based production practice, as other parts of the media industries and media production underwent rapid digitalization.

In the late 1990s, digitalization would begin to overtake the techniques of cinematography. This trend placed cinematographers in a defensive stance that was unprecedented in their professional history. As later chapters will show, digital color correction, high-end telecine and film-scanning, the emergence of digital projection, as well as high-definition video cameras and digital video, put cinematographers back in conflict with producers and technicians over their place within the division of labor, a reprise of debates going back to sound, Technicolor, and wide-screen. The conflict was different this time, though, because of qualitative and material differences in the infrastructure of cinema itself—digital technologies seemed to foreshadow the removal of film from the equation of moviemaking entirely. This led some to ask whether the very definition of cinematographer might collapse into other parts of the production process.

[222] See Bordwell, *The Way Hollywood Tells It*, 155.

CONCLUSION

As Stephen Prince has noted, digital technologies represent both a threat and a promise to cinematographers.[223] On one hand, as the motion picture image becomes more malleable, there are more points in the production and post-production process during which the visual plan of the film can be manipulated, and thus, more points for the cinematographer to "work" the image. On the other hand, other production personnel, from production designers to colorists to editors, now have the technological means to make decisions and radically re-shape the image in ways that have historically been the province of the cinematographer.

The cinematographers' historical relationship to the Hollywood mode of production demonstrates their willingness to shepherd new technologies into the studio system, even as they fight for a durable form of authority within the tissue of craft relationships that sustains it. However, digitalization was a much different process than the adjudication of competing color film systems, or the displacement of sunlight and arc lighting by the Mazda tests' incandescent bulbs: through the 1990s *AC* engaged in a sporadic campaign to educate its readers about digital technologies, especially in the area of digitally-based color correction and special effects. The real debate over the future of cinematography began in earnest after 1998, around the time producer George Lucas announced his intention to abandon film for the final two installments of his *Star Wars* franchise, and two studio-financed pictures, *Pleasantville* and *O Brother Where Art Thou*, made prominent use of post-production tools to change their cinematographic look. Between 1998 and 2000, cinematographers began to debate, dismiss, embrace, test, and tinker with digital cinema. In late 2002 the ASC took the step of forming a technology

[223] Stephen Prince. (2004). "The Emergence of Filmic Artifacts: Cinema and Cinematography in the Digital Era." *Film Quarterly* 57(3) (2004), 24-33.

committee and moved more forcefully into the technological development process, the first time in some thirty years the ASC had formed such a committee. After almost eighty years of fine-tuning one technological system built around the medium of film, they realized they would have to demonstrate again that the value of cinematography lay in serving the expressive possibilities of light, shadow, and story—and that they were prepared to bring that craft knowledge to bear in the new, digital Hollywood.

Chapter 4: Cinematographers and the Digital Intermediate

In his article "Digital Cinematography: A Phrase of the Future?" (referenced in the introduction), Bob Fisher introduced the phrase digital cinematography and considered the implications for cinematographers. In the same article, Fisher introduced another new term that would become significant: the "digital intermediate." He does not provide a detailed description of the digital intermediate technique, except to say that it involves converting filmed pictures to digital files in order to manipulate the images.[224] The digital intermediate (or DI) was an additional step in the post-production process. Traditionally, film-based post-production had begun in a film laboratory (or "lab") and involved laboratory technicians and a timer, whom the cinematographer supervised to arrive at a film's "look"—visual qualities like shadow, color, contrast, composition, and grain. With a DI the finished (i.e., edited) or nearly finished program was scanned frame by frame into digital form, allowing minute changes in color, contrast, or grain from shot to shot, frame to frame, or even within a single frame.[225] The revised frames could then be transferred back to film on a digital-to-negative film printer from which the final, distributed film would be struck. The role of timer was replaced or supplemented by a *colorist*, whose specialized technical skills and access to the project's imagery in the latter stages of production gave him considerable opportunity to influence a film's "look."

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[224] Fisher, "Digital Cinematography…", 50.

[225] The digital intermediate process would go by several names by the end of the decade, including "digital film mastering," a term used in some later *AC* articles, and, as described in Kristin Thompson's *The Frodo Franchise,* "selective digital grading." In *Harnessing the Technicolor Rainbow*, Scott Higgins calls it "digital color grading." Digital intermediate emerged as the common term, though, a coinage that to some extent highlighted the technique's role within a film-based, photochemical workflow and thus the cinematographers' role in maintaining that workflow.

Overseeing the "look" though development and printing of the film negative they expose has long been a part of the craft and institutional role of cinematographers. In most cases the cinematographer was expected to return to the film lab, weeks or months after the completion of principal photography, to supervise the printing of the "answer print," for final review.[226] The number of film laboratories (or "labs") equipped to service professional cinematography is extremely limited and some of the names, like Technicolor or Deluxe, are almost as storied as the studios themselves. Cinematographers cultivate connections with particular labs and lab personnel, establishing working relationships and shared languages, becoming familiar with the standards and procedures of each lab. The lab develops each day's filming, printing "dailies" for the cinematographer and director to review together, and, at the conclusion of editing, printing the answer print, and, typically, release prints for distribution.

At each of these stages, the cinematographer usually worked with and supervised the lab's timers to hone and refine the consistency and desired look of the film. Often a cinematographer would order special printing techniques to establish particular looks, colors, densities, or myriad other effects that can be achieved using the photochemical process of developing film. It was the job of the timer to achieve these looks and maintain them in the absence of the cinematographer. The DI added an enormous range of new affordances to this system and, more to the point, these were functions that the colorist could usurp from a cinematographer, unless the creative intent of the cinematographer was protected—either by the colorists' respect for the designated look, or on a producer or director's instructions. Fisher discussed these concerns in the April 1993 article and described three films with releases planned that summer—*Super Mario*

[226] The definition of "answer print" varies from project to project, but in traditional film-based production it is typically the final (or nearly final) printed version of a film, fully edited, color-corrected, scored, and with synced audio. Viewed by the full production team, the "answer" of the producer or director determines if the film is ready for printing and distribution.

Brothers, *Jurassic Park*, and *The Last Action Hero*—that were the products of DI, "super-saturated" with images created in computers and relying on digital post-production techniques to composite (i.e., combine) live action with computer-generated images.

Fisher's linking of DI to post-production is significant; even as he perceives the emergence of a "digital cinematography," the digital tools he discusses have already taken root in different areas of the detailed division of labor in film production: editing and special effects. The emergence of the digital intermediate joined these "hybrid" film-video-digital workflows as the advance wave of what would come to be called digital cinema and a technological transformation that would force cinematographers to start rethinking the boundaries and possibilities of their craft. In 1993, Fisher saw the digital intermediate as having just a few promising "practical applications" for cinematographers, such as easier wire removal and "scene salvage," in which scratches on original film negative or a few indispensible frames with unintended shadows or reflections could be revised and made usable. Fisher relates a story of an (unnamed) actress whose "unattractive underarm hair" was removed using the special post-process, in what "might have been the most expensive haircut in history."[227]

Fisher celebrates the digital tools as a potential revolution in the practical and creative aspects of filmmaking, but only if "intelligently applied." He quotes Alan Daviau, who predicted a day when cinematographers would have the same creative latitude as fine arts photographers like Ansel Adams, having access to new tools to protect the "integrity" of their work. The notion of "integrity," or maintaining the cinematographer's creative intention, would become a major theme throughout the digital transition. Already, Fisher noted, it was possible, although prohibitively expensive, to

[227] Fisher, "Digital Cinematography," 51.

alter color and contrast, de-focus or sharpen images, and add or subtract elements in the motion picture frame. He saw the implied threat to cinematographers in the digital intermediate process. Flexibility could be a dangerous thing. There was, Fisher wrote, "a story currently circulating about a studio executive who suggested that digital post-production could eliminate the need for artistic lighting," because the art of good lighting could be applied in post-production.[228] This was an affront to the "artistic instincts" of cinematographers, Fisher writes, and also not very practical. In any case, the cumbersome and expensive process of digitizing, manipulating, and re-recording film meant that this sort of meddling was well in the future. Nonetheless, he concludes, "The past several years could be compared to a trial courtship between the film production and digital post-production communities. The romance is definitely heating up."

It did heat up. In the space of just a few years, the DI emerged as a significant and widely discussed new technique in film production and seemed, by the end of the decade, poised to become a standard part of the filmmaking process. The DI became, as Fisher predicted, cinematographers' "fondest dream" and their "worst nightmare." Through interviews and trade press accounts, this chapter examines how the DI promised unprecedented degrees of creativity, while also threatening cinematographers' sense of their craft authority. Cinematographers reported that they perceived these threats in four main areas: First, in the migration of key tools for creating and finishing "looks" away from the film set—the traditional site of the cinematographer's greatest authority—toward the laboratory and post-production process. Second, the cinematographer's compensation for time in the laboratory was often not included (or was deemed implicit) in their contracts, leading many cinematographers to fear they would be in the position of "voluntarily" grading film prints in order to protect their work and reputations. Third, in

[228] Fisher, "Digital Cinematography…", 51.

the lab, it became clear there would be more "eyes" on the film and more meddling hands during the DI, including not just the producer and director, but also a new collaborator, the colorist, and potentially other technicians. Finally, the broad perception within the film and television industries of a radically new level of malleability in filmed images created a reaction among cinematographers, who increasingly sought, defensively in many cases, to define what in their craft was not "technical." What in this art form did not rely on tools, technologies, or technique, but rather bespoke a unique contribution, a singular vision, a "cinematographic art?" What was conceptual and what was mere execution?

THE ORIGINS OF THE DIGITAL INTERMEDIATE

Although in his article Fisher was introducing a relatively new concept to the professional readership of *AC*, the DI process had been a decade in the making and was familiar to cinematographers and editors working in television and commercial production, although the process was not called "digital intermediate" in those precincts. As with movies, most television programs and commercials originated on film, but by the late 1980s raw footage for television and commercial post-production was often transferred to videotape for editing and finishing in video-based non-linear editors, such as the "Harry" system, manufactured by Quantel, a British company. Video display requires significantly less resolution than cinema and, since the early days of video, television producers, no less than movie producers, had sought compelling images in their productions. They seized on computer-based special effects and graphics, image compositing, and other means of designing novel images, and because the technical requirements were considerably less demanding for creating video-based digital effects than film-based, the use of digital post-production tools advanced rapidly in television though the 1980s. By the 1990s, there were two dominant technology companies

providing digital post-production tools for video, Quantel, and Discreet Logic, a Canadian firm. These tools were not familiar (nor useful) to many cinematographers in film or television, though. These service providers were not centered in Hollywood, nor were they familiar to film laboratory personnel like color timers and printers. They were strictly video-based post-production techniques, confined to music videos, prime-time television, and commercials.

Meanwhile, in film, there was a parallel, but trailing, track of digital research and development. Through the late 1980s, Kodak developed a process for scanning short segments of film into digital format for remediation (such as fixing scratches and breaks), limited special effect usages (such as wire removal), and restoration. The Kodak process, dubbed the "Cineon digital workflow," was a combination of software for revising, or "painting," the scanned film frames, and advanced hardware capable of both scanning the original film negative and then printing the revised images back to a new negative. In 1989, Kodak announced the creation of a facility called Cinesite in Los Angeles offering the Cineon workflow, primarily intending to service the Hollywood studios' enormous but decaying vaults of back catalog holdings. (In 1987, Disney had announced a restoration and preservation program for its entire back catalog.) The Cineon software was delayed until late 1991, though, and Cinesite opened in late 1992, well behind schedule. Disney's 1993 re-issue of *Snow White and the Seven Dwarfs* was one of Cinesite's first projects. In any case, Kodak and Cinesite focused their marketing on Cineon's ability to revise and restore images and assist in special effects integration—that is, on the value to post-production and special effects personnel—which was of little interest to its cinematographer client-base.[229] Cinematographer Curtis Clark said he was

[229] Curtis Clark, interview by the author, July 25, 2005, transcript.

mystified at the time that Kodak would offer tools that were of no use of cinematographers and, in fact, undermined the practice of cinematography:

> I vividly remember that. They wanted us to see those as digital tools for our imaging. To think of it that way. The one problem is that these tools only reside in a post-production facility and there was nothing we could take on location and cinematographers weren't necessarily involved in that, so they were offering tools…that were showing us the Promised Land but not showing us the path to get there. If anything, showing us others could use the tools without us. And Kodak, of all people, doing it![230]

By 1993, then, as Fisher penned the "Digital Cinematography" article for *AC*, the digital intermediate was already emerging as a technology that wedded two parallel tracks of research and development, originating from separate places within the ecology of media production (film versus television and commercials), and complicating established craft relationships, not merely by mingling the workflows of film with television, but also within the entirely film-based workflows familiar to cinematographers. Kodak's primary clientele were cinematographers and the studio-based film industry; meanwhile video (and digital) service providers such as Quantel, Discreet Logic, Sony and others were working with post-production personnel. Kodak's Cineon, a precursor to the digital intermediate, crossed this frontier. *Variety* published a series of articles on new technologies and workflows in early 1994, focused primarily on the seamless merging of live action, digital effects, practical effects, miniatures, and the like.[231] ACS member John C. Hora, noting that cinematographers were being forced to move from "in-camera control to out-of-camera apprehension," said: "Time is doing to cinematography what earthquakes do to the earth."

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[230] Curtis Clark, interview by the author, July 25, 2005, transcript.

[231] "Deep Space Nine," *Variety*, February 24, 1994; Gregory Solman, "Holding Out a Light on the Future," *Variety*, February 24, 1994; Gregory Solman, "Digital is the Future and the Future is Now," Vareity, April 27, 1994. "ASC Panel Focuses on Tech Advances," *Variety*, June 10, 1994.

Kodak discontinued the Cineon system in 1997. The possibilities of their promising new technique may have been limited by the long-standing, almost symbiotic, vendor relationships in the Hollywood mode of production, or as an end-to-end digital cinema "solution" it may have been ahead of its time. In any case, the system did not sell, although, the image file format on which the system was based (also called *Cineon*), became a de facto industry standard for creating digital intermediates and the components of the system won numerous technical awards from the AMPAS. Cinesite, with locations in Hollywood and in London, continued successfully as one DI and special effects service provider among many.

COLOR AND CINEMATOGRAPHY

If, as Clark's sense of betrayal suggests, Kodak's move into post-production and special effects was disorienting for cinematographers, it was because the DI process was still a poorly understood technology and one with no clear role in the craft traditions around film production. Fisher had recognized that color, contrast, and other image qualities could, in the near future, be manipulated digitally, but did not foresee how quickly and with what flexibility these techniques would emerge. Part of the problem lay in the subject of color itself, which is a complicated aspect of cinematography's craft authority. Few would dispute that light and shadows are central to the practice of cinematography, be it a craft, art, or past-time. As the experience with Technicolor showed in the 1930s, color as an aesthetic practice and device in the construction of a film's look could be subsumed by other experts in the production process. John Alton's influential craft manual *Painting with Light* (1949) dwelled on the possibilities of black and white cinematography. Alton was one of the architects of *film noir*, with its stark, graphical black and white imagery, as seen in his *T-Men* (1947) and *He Walked By Night* (1948). In a preface to the 1995 edition of this book, Todd McCarthy quotes Alton:

"Black and white are colors…I see more in the dark than I do in color," a conception grounded in the golden age of the black-and-white dominated studio picture.[232] Alton's book is lionized by many cinematographers today, but in Alton's time his devotion to black and white was not universally appreciated. *AC* ignored the book for years and some cinematographers rejected Alton's approach as "amateurish." By the late 1940s, color cinema was the coming thing and cinematographers had struggled to maintain their expressive lighting choices through the Technicolor years. Kodak would soon release "monopack" color film designed to be used in standard movie cameras and, in this more standardized format, color would begin to find a place in the craft practice of cinematography. Still, light and shadow were indisputably the most common shades of "paint" cinematographers applied to their "canvas," the movie screen; the reception of Alton's book reflects the craft's ambivalent relationship with color in the mid-century.

Even in the era of color cinematography, though, color and the qualities of color in a motion picture are not well-developed areas of practice that "belong" to cinematography. On one hand, the palette, or range of colors and their relationships present in a work, is typically a product of collaboration by the director with the production designer, who selects or guides the selection of paints, fabrics, and decorations that establish that palette. The cinematographer may consult in this process, but only to the extent of testing the chosen recording medium's ability to capture the palette established by the production designer's team—in other words, the cinematographer's role vis-à-vis "color" is largely to protect the creative intention of the other designers. On the other hand, creating color is clearly a cinematographic process, and color strongly influences composition, which most cinematographers do consider part of their contribution.

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[232] John Alton, *Painting with Light* (Los Angeles: University of California Press, 1995), ix.

This somewhat muddled place of color within the detailed division of labor has led cinematographers to call for a better understanding of color theory and the artistic possibilities of color. In 2002, French cinematographer Henri Alekan (*Beauty and the Beast* [1946], *Roman Holiday* [1953], *Wings of Desire* [1987]) said:

> …my point of view is that as far as the art of color is concerned, cinema is way behind painting. One day there will be filmmakers who will have a real view of color; they will express themselves cinematographically through color, and not merely in color. This concept isn't accepted yet.[233]

More than any other cinematographer, Vittorio Storaro (*The Conformist* [1970], *Apocalypse Now* [1979], *Reds* [1981], *The Last Emperor* [1987]) has argued for cinematographers to take a hand in creating with color. In articles written for *AC* and in profiles of his work, he describes creating written treatments detailing the color schemes for his camera work in relation to the story. Of *The Last Emporer*, he says, "The idea was the color spectrum. When I visualized the film, I was trying to represent life with visible light. Each color of the spectrum stands for one portion of life."[234] In Storaro's highly elaborated theory, color not only has value within the symbol system of a movie, but has actual physiological and emotional effects on the viewer that a cinematographer can use to shape the audience's experience.

The validity of these claims, or effectiveness of these uses of color, I will leave to other critics. To some extent Storaro's reputation rests on his distinctive, stylized use of color, while the most cinematographers use less-stylized, more representational color in their work. Many decisions about palette come from other craft areas, such as the production designer and her team of costumers and set designers. The scriptwriter may indicate color or tone, and outdoor locations can play a role (green hillsides, for example,

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[233] Quoted in Benjamin Bergery, *Reflections: Twenty One Cinematographers at Work*. (Hollywood: ASC Press, 2002), 98.
[234] Bergery, 238.

or yellow sands). The director will try to coordinate or influence these options within the overall shape of the narrative. Storaro's exceptionally refined positions on color are exceptions I would use to illustrate the rule: the scope of cinematographers' authority to define the palette of a production is typically narrow. However, they have historically enjoyed considerable authority in the process of shaping, fine-tuning, deploying, and ultimately realizing that palette in their role as photographer on the set, designer of the light, and supervisor in the film laboratory.

CINEMATOGRAPHERS IN THE LABORATORY

The development of the digital intermediate complicated this relationship between cinematographers and the laboratory process, and specifically, their relationship with a new collaborator, the colorist. A 1990 article in *AC* encouraged cinematographers to learn more about "electronic post-production," i.e., video-based color correction (also known as color timing). The author conceded that the process "hasn't always had the best reputation among cinematographers. In the early stages of its development it was a great way to ruin good photography."[235] She quotes a working colorist, "I think it's obvious from the last three shows that I have done that directors of photography are very uncomfortable getting involved in the color timing process." But the cinematographer should get to know them, the colorist said, especially "if he wants to get a certain look." The use of colorists to achieve special or unusual "looks" would eventually become a main theme of their collaborative contribution. In 1993, though, they were seen as a complication, as in Fisher's warnings about the demise of "artistic lighting" under the hands of non-cinematographers.

In the years that followed, tensions continued over balance of power between cinematographers and colorists. In February 1995, the ASC and Kodak Company

[235] Nora Lee, "Electronic Post-Production Demystified," *American Cinematographer*, September 1990, 52.

sponsored a panel discussion that included cinematographers, colorists, and post-production engineers. *AC* published an edited transcript of the event, prefacing it, "As digital technology…gives post professionals more leeway to alter the cinematographic image, some cry foul, and others see opportunity."[236] The cinematographers on the panel were generally skeptical of the new technique; their greatest concern was the future of their role in post-production, specifically how they would protect their own and others "creative intention" through the production process. Colorists and technicians on the panel acknowledged this danger, one saying, "things can get out of control faster," while also proposing a solution: an expanded role for their specialization, via an earlier engagement in the process. Against this, cinematographer Marvin Rush complained, "As we get more capable, we put more and more power in the hands of people that are not credited or given title of cinematographer." The panel offered only cold comfort to cinematographers, but there were points of agreement, for instance, that "film-look" was still the standard by which quality imaging should be judged and that the director's point of view should resolve conflicts. Thus, in this panel discussion, conflict was papered over in ways that would become familiar over the next few years: the established division of labor that relied on the director to resolve aesthetic disputes and the technical superiority of film as a shared aesthetic benchmark for the crafts.

In May 1995, *AC* published an extended feature on the "color conundrum" in which Rob Hummel, a prominent cinema technology expert and President of Technology at Dreamworks Studio, pointed out "color timers see more films than any cinematographer could see in an entire career—a lot more," a rather bold claim to make before the most celebrated cinematographers in the craft.[237] Hummel issued warnings

[236] Debra Kaufman, "Wielding the Double-edged Sword: Digital Post and Graphics," *American Cinematographer*, May 1995.
[237] Christopher Probst, "Color Conundrum," *American Cinematographer*, May 1995, 79.

against several aspects of cinematographers' traditional practices, such as using filters to change the overall color values of a shot, describing this as an unnecessary "commitment" to a particular look. "Once you've shot with a filter, a timer can't get it out," Hummel said.[238] Similarly, cinematographers were warned not to be excessive with shadows. Finally, the article urged, cinematographers should carry their preliminary tests of film stocks all the way through the workflow to the stage of the release print (i.e., a print ready to deliver to theaters), a sensible precaution in most cases, but also an expensive process that is rarely at the discretion of the cinematographer.

Proposals and discussions about the digital intermediate in this period were typically framed as an advancement within the practice of cinematography, as opportunities for more control of images (by delaying the moment and expanding the choices for changing tonal values, for example) or improved, more reliable workflows (established through more testing). However, each of these proposals cut against the authority of cinematographers in two ways. First, they reduced cinematographers' ability to "lock in" or commit to strong color choices or expressive lighting through decisions made during principal photography. Second, in organizational terms, they created a more interlocking, technically complex workflow with less room for spontaneous "creative" decision-making or discoveries found through the production process. The idea of limiting the use of strong shadows seemed especially contrary to the craft. In the somewhat plaintive words of one dissenting voice on the USC panel: "the use of shadows is the art of the cinematographer."[239]

[238] Probst, 79.
[239] Probst, 80.

FOUR THREATS TO CINEMATOGRAPHER AUTHORITY

By the late 1990s, then, the DI concept was coming into focus technologically and institutionally. Because of cinematographers' historical relationships to color, the film laboratory, and post-production personnel, many questions remained about the DI's future as a production practice and, more significantly, the role of cinematographers in that that future. Looking back, Curtis Clark described it as a period of anxiety,

> There in the late mid-late 1990s, the crunch period when things really started to change technologically for better or worse. Many people think, initially, dramatically for the worse. It certainly created anxiety and although there wasn't this impending sense of doom, meaning 'film is dead, we're all going to have to retrain or have no jobs,' that wasn't there.[240]

In interviews with cinematographers about its impact on their craft practice, the digital intermediate was described as threatening cinematographers' sense of their own authority in many ways, which I summarize here within four main themes: the changing sites of craft authority, issues of compensation and contracted participation in the creative process, the challenges of new collaborators, and the problem of radical new degrees of malleability of filmic images.

On the set

In the detailed division of labor that prevails on most movie sets, the cinematographer is the head of the camera department, responsible for assembling a camera crew of specialists such as camera operators, focus pullers, camera loaders, dolly grips, and other assistants. This team's workplace is "the set" and it is in the company of these people and the technologies of image capture that comprise the primary work environment of the cinematographer. Curtis Clark describes how cinematographers'

[240] Curtis Clark, interview by the author, July 25, 2005, transcript.

authority and influence in the craft's familiar division of labor is based on the film set, and flows into the post-production setting:

> That's where we have control, is on set. We traditionally control it on the set and traditionally, in the photochemical workflow, we do the grading of dailies and we control that through the timer, and usually control the final color grading of the answer print.[241]

The "it" Clark refers to here is the overall look of the film. The cinematographer, as a contributor to and protector of key aspects of a movie's visual design, is expected to achieve that look through decisions made during pre- and post-production, on the film set, then through the grading, or adjustments to color, tone, and development processes in the printing of dailies, through the final grading of the print delivered to the studio for approval.

As Clark describes his colleagues' and his practice, most cinematographers try to stay engaged in the production of the film prints all the way through theatrical and ancillary distribution as well, although not all cinematographers choose to, or are allowed to:

> We'll come back and do grading on the duplicate negative for release prints—that's very much a long-standing tradition—but after that, whether you come in and do color grading for telecine transfer for video or DVD, it depends on contracts. Some cinematographers do, some don't.[242]

Clark and other cinematographers evoke "tradition" repeatedly in these descriptions, illustrating the significance of past practice (or the history of the craft), the variability of that practice—"control" in this craft always being subject to negotiation—and also hinting at how these practices have been thrown into uncertainty by digital post-production. In the past, the further a film moved into post-production, especially the latter stages of post-production, the less input and influence a cinematographer could expect to

[241] Curtis Clark, interview by the author, July 25, 2005, transcript.
[242] Ibid.

have in the creative process. The set, though—whether on a soundstage or on location—was reliably the venue of the cinematographer's greatest authority.

In the mid-1990s there was a foreshadowing of the digital intermediate debate when Tiffen, a maker of industry standard colored gels and lens filters, created "digital filters" for use in digital post-production (at that time, still confined to commercials, television, and special effects houses). Tiffen's software emulated what had, until then, been a "glass" technology—that is, a physical object, in the realm of what cinematographers chose to attach to their cameras or lighting instruments to create certain looks, and replaced it with a piece of software. Clark recalled that as the moment he realized cinematography was going to change:

> They did the entire range, whether it was a coral, or a tobacco, or standard color conversion or correction filters like balancing filters. The whole range could be applied digitally. So that raised an extremely interesting situation, one that was very problematic because these are tools that were ultimately going to be used on SGI machines in a post-production environment, we don't exactly walk around with SGI machines or this kind of software at our disposal—they don't exactly run on a laptop. The long and short of it was, it was like an epiphany, a terrifying one. Here's a peek into the potential of what this technology can do, but by the way, it's across the English Channel and you have to swim to get there.[243]

This quote represents a common attitude toward digital technologies, that they were both a source of invention, of "potential," but also a "terrorizing" force as decisions once confined to the set moved into other locations. Yet, cinematographers are generally reluctant to discount or discourage new technologies or techniques (indeed, they often invent them). The core issue is one of authority. As cinematographer David Mullen said, "We don't want fewer tools, we want more control."[244]

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[243] Ibid.

[244] M. David Mullen, interview by the author, August 15, 2004, transcript.

Compensation for Post-production

If the ability to make creative choices on set and have them respected though post-production is one measure of authority in the crafts, getting paid for your work is another important index. With the advent of digital intermediate, cinematographers felt more pressure to stay involved in the production process through post-production to protect the integrity of their work. However, standard contracts did not encourage (or allow) cinematographers to continue in a creative capacity during post-production. Historically, cinematographers might negotiate for a few days of paid work in post-production, but more often a cinematographer would come to the lab *gratis* to help grade the answer print as his or her schedule allowed. To some cinematographers this is just part of the craft, included in their negotiated fee, and in any case a necessary contribution that serves the show and protects their own reputation. Cinematographer Bob Primes describes this tradition as a "courtesy," but one that diminished his authority if he was not being paid. "Traditionally, you would shoot the picture and you would come in to color correct as a volunteer; that meant the producer didn't respect you particularly because you weren't being paid."[245]

With the coming of digital intermediates, the possibility of dramatically changing the look of a show in post, and even in some cases the *reliance* of the look on post techniques, put extraordinary pressure on cinematographers to maintain close contact with the production process beyond the film set and into post. Stephen Lighthill, an experienced television and documentary cinematographer, said, "Now we're being asked to sit in color correction suites for weeks on end, weeks, not days, without compensation. Because traditionally it hasn't been compensated, it's just what they [producers] are used to. I hired a cinematographer for this amount of money and I've got him. That's a big

[245] Robert Primes, interview by the author, August 23, 2005, transcript.

problem."[246] Paying the cinematographer in post-production has raised thorny labor issues, one the International Cinematographers Guild had confronted even before the advent of digital post-production. Some contracts now include a week of post-production time for the cinematographer, if their agents can secure it. "There is a delicate balance between feather bedding and giving a proper size crew for people to a decent job," Primes allowed, but most producers would resist paying a cinematographer and colorist, seeing it as two people doing the same job.[247] Producers have realized that cinematographers will essentially volunteer for a minimum amount of color timing: "It was our work," Primes said. "We want to make sure it's done right."[248] But he felt something was unfair about this arrangement. "You are not overpaid compared to other people on the set. You are not overpaid compared to directors and producers and writers and things like that, so why should [the producers] get one to three weeks free? The answer is, you shouldn't. But you could."[249]

New Collaborators

Cinematographers are willing to work for free or in an ambiguous contract situation because the idea that other personnel in the workflow—producer, director, editor, or colorist—could decide to alter an image with the use of "digital filters" or the DI was anathema to their craft traditions. Beyond their role as department head of a team of camera technicians, cinematographers see themselves as the most highly trained "eyes" on the set, the "guardian of the image," implying not simply a gatekeeper role, but that of an architect, a responsible party, a creative voice. To lose control of the image was not merely a matter of professional pride, it was a risk to personal reputation. Lighthill,

[246] Stephen Lighthill, interview by the author, August 20, 2005, transcript.
[247] Robert Primes, interview by the author, August 23, 2005, transcript.
[248] Ibid.
[249] Ibid.

who is an instructor at the American Film Institute in addition to being a working cinematographer, described the role of a cinematographer in relation to other craft workers (including other cinematographers, such as second-unit cinematographers):

> The cinematographer, even when there are two cinematographers, you're the person, the only person that's on set all the time, besides the AD [assistant director], the only person—more than the actors, more than producers, more than the director.[250]

This singular notion of authority, of the importance of hierarchy and structure in the formation of work teams, is a key feature of cinematographers' work and craft. Collaboration, although often conceived as a kind of consensus process, is, in the practice of cinematography, less the product of consensus than one person—"the only person"—and their work team doing their jobs very well. For example, this is how Lighthill described his relationship to his second-unit cinematographer on the television program *Nash Bridges*:

> They would call me if they were in the middle of something and say we have a choice of doing it this way or that way, what would you do? So, you're that mind that's controlling the visual language. It's not better, just different. It's just one mind and it's important that there be one mind.

"One mind" must be responsible for the look of a film. Lighthill described his willingness to work unusual hours during *Nash Bridges*, commuting from Los Angeles to the show's San Francisco location in order to protect the look of the show:

> So, on Friday I would go to Burbank, from San Francisco, and spend half a day at least color-correcting the show, then take about a day and a half off and go back to work. So it made the process extremely difficult. Not that I wasn't compensated—I didn't care. But I had to spend half a day…doing color correction, but by doing it I influenced the way wardrobe went, I had a lot of control over the way I worked, I think that production was faster because sometimes I would shoot stuff knowing that I was going to be in the suite and I could change certain aspects that I couldn't get perfect at the time. So you have a tremendous amount of authority and responsibility.

[250] Stephen Lighthill, interview by the author, August 20, 2005, transcript.

Not every cinematographer can commute from set to laboratory on a weekly basis and so the communication between laboratory and cinematographer has always been of great concern to cinematographers. Allen Daviau relates a story of his work with Steven Spielberg on *Empire of the Sun*, a film that undertook three weeks of location shooting in Shanghai, China in 1987. The film's dailies were flown to London for processing and, because of the difficulty of getting the dailies back into China, Daviau and Spielberg had to rely on the descriptions of the film's editor Michael Kahn and Bob Crowdy, the laboratory's color timer, to know if they had achieved the look they were trying to create. According to Daviau, when he finally had a long weekend he flew to London to look at the dailies, he found "they were a little warmer than I expected, but it was fine. I knew, from using printer lights, how it would be."[251] One of the challenges of digital intermediates that would emerge quickly was the lack of a common language for describing adjustments, as with printer lights. There was, in Daviau's words, "no objective measure for exposure. You just have someone turning knobs."[252] Presumably there is an "objective" measure to be found with DI, but it was unfamiliar to most cinematographers and, moreover, in the hands of a new collaborator that did not necessarily report to the cinematographer.

These examples are from the traditional photochemical-based workflow, but they illustrate the cinematographer's conception of his authority. The creation of a film's look has an unavoidably subjective dimension and cinematographers were keenly aware that a subjective quality is one vulnerable to "input" (or "meddling") by others in the division of labor. The traditional structure by which a cinematographer supervised a lab's color timer through a limited array of "printer light" choices was replaced by the apparently

[251] Personal communication with Allen Daviau, March 22, 2010.
[252] Ibid.

infinite possibilities of the DI, described by Curtis Clark as "Photoshop on steroids."[253] Lighthill said, "[With digital intermediate] without doing anything weird you have 26 choices. That you can just touch. It doesn't go from 1 to 11, it's a trackball. You don't know what position your position is on the ball, unless you have a really developed eye."[254] The basis for claims of authority then, comes down to that "developed eye" and the cinematographers' presumed knowledge of the overarching creative intention of the principal contributors, filtered through their own special contribution as a visual artist. As Sean Fairburn put it:

> I'm the one on set that looks at an actress's dress and says, 'this is what it is supposed to look like.' The colorist doesn't know that the teal dress was actually teal. If the film or the electronic medium slightly shifts, he is not going to know that need to be pulled back to teal. I am the guardian over this image. If I can capture an image that looks closer to where I want to be, then my colorist, my visual effects producer, and whoever else is downrange already sees where I am going. Let's defer very expensive decisions until later on? This isn't that kind of job.[255]

The Malleable Image

Cinematographers may find deferring decisions a mark of unprofessionalism, but digital production tools have created an era of radical new malleability of motion picture images that makes such caution very tempting. Undergirding all of cinematographers' concerns about where the tools are, who gets to use them, and who gets paid for what jobs, lay the simple fact that pixel-by-pixel flexibility has allowed image manipulation within a stylistic domain that cinematographers considered their own, namely, the "look" of the film and the consistency of that "look." Consistency—that is, maintaining uniform and stable tones, colors, contrast, and grain across cuts, between scenes, or throughout a show—is one of the defining qualities of continuity style and the professional

[253] Curtis Clark, interview by the author, July 25, 2005, transcript.
[254] Stephen Lighthill, interview by the author, August 20, 2005, transcript.
[255] Sean Fairburn, quoted in "The Color Conundrum," 1995.

cinematographer see his or herself is its guarantor. Lighthill, in his capacity as an instructor at the American Film Institute, teaches cinematography students that consistency is one of the most important aspects of the craft. Without the eye of the cinematographer creating consistent skin tones and constructing formal consistencies in the use of shadow and light, the audience would become lost. For example, Lighthill said:

> If you look like you in this room, when I see you in this room at night, you still have to look like you, not a different person. That means the way your features are altered by the focal length of the lens, skin tone and how that's represented, right? So, it's enormously important in what we do, to be consistent.[256]

One of the virtues of the 35mm photochemical workflow was the degree to which is locked in a certain look. We might think of this as a process by which the cinematographer was able to delegate her authority to the film (and its relative inflexibility as a medium), allowing it to protect her creative intent downstream in the collaborative process. The qualities of particular film stocks guaranteed a kind of consistency. Thus the possibility of tinkering with the qualities of light, color, or contrast was profoundly worrying. Speaking in 2000, John Toll said, "I think the biggest immediate issue is how digital manipulation of images affects individual artists, in terms of being able to maintain integrity of their work. It seems like filmmakers have always had to fight for their work to keep it from being changed by someone for some reason or another."[257]

The cinematographer's privileged position has rested on the ability to create and protect his or her intended look. The look may be imagined in concert with producers, directors, production designers, and other department heads, but once that plan is established the cinematographer's role, as the "guardian of the image," was to use the finicky, fragile, and arcane photochemical workflow to achieve and protect that look,

[256] Stephen Lighthill, interview by the author, August 20, 2005, transcript.
[257] John Toll. Transcription from ICG online Q&A, September 2000.

typically with some of his or her own aesthetic contributions in the mix. Curtis Clark described cinematographers' authority as historically derived from film and "film-look:"

> By definition it was baked into the negative. To a certain extent because you are filtering the negative, you are exposing the negative in a certain way and there is only a limited amount of things—if you are doing traditional film printing—that you can do. You have to basically print it based on how it is exposed. And the exposure determines the results, so the cinematographer pretty much controls the look of what is possible through the way that negative was exposed.[258]

Clark understood exposure as not merely a technical process, but the product of experience, aesthetic judgment, and tacit knowledge:

> You had to understand negatives, you have to understand how to expose it, you didn't have pre-visualization aids to do this, you did some testing. But it was through experience. And so you were able to fashion, you know, your skills and create your art based on your instincts, your hunches, your vision but your knowledge about how to manipulate the process.[259]

The malleability of motion picture images in the new post techniques threw that craft prerogative into question, leaving cinematographers to argue that their "special contribution" really had nothing to do with technique or technology per se, but rather existed in a category of its own—the eye of the cinematographer, cinematography as an art, disconnected from particular technologies. This view was conveyed in Stephen Lighthill's comment:

> Because whether it's digital or originates in film, if you don't go the direction the cinematographer intended the image to go, then you are fighting the image, and you will have a much weaker piece … It's not only not cost effective at all, it's fighting the image and you end up with an image that is heavily processed and doesn't look the way it should look. Unless that's what you want.[260]

In other words, other crafts should beware meddling with the intentions of the cinematographer. Lighthill's final statement, though—"Unless that's what you want"—is an important and revealing recuperation. The craft worker will threaten, follow my

[258] Curtis Clark, interview by the author, July 25, 2005, transcript.
[259] Ibid.
[260] Stephen Lighthill, interview by the author, August 20, 2005, transcript.

experience, or you'll end up with a heavily processed (read: inferior) image. And then, he will add, "Unless that's what you want." This statement illustrates the dilemma for cinematographers and for all forms of craft authority: You are the "guardian of the image" (or of your area of specialization) right up to the point you at which are not. This represents a limit of craft authority on questions of film style and the production apparatus, a point we will bump into again and again in this study. A cinematographer must protect the craft prerogative to make an image "look the way it should look," until the exigencies of other authorities intrude. In the chapter that follows, this balance between collaboration and authority is explored through two case study films, *Pleasantville* and *O Brother Where Art Thou*, in which novel "looks" were created that necessitated quite different degrees of authority for the projects' respective cinematographers. In "collaborative" environments of almost unlimited aesthetic choice—such as that represented by the DI—and creative workers with competing claims to authority, the weapons a cinematographer has to defend his or her aesthetic turf turn out to be limited: his or her own experience and reputation, past relationships with other centers of authority (directors, producers, etc.), and the stores of craft knowledge and technique they bring to bear on those conflicts.

PROMISES OF THE DIGITAL INTERMEDIATE

The DI was not universally reviled by cinematographers. There were, of course, the "practical applications" of remediation and repair that Bob Fisher had pointed out. Even in early discussions of the technique cinematographers saw the ability to more finely control the looks and results of their work and an expanding range of "looks" cinematographers would be able to bring to cinema. From the mid-1990s forward, the trade press and service providers were filling the pages of *AC* with enthusiastic endorsements and advertisements for the DI. Some saw the prospect of increasing

authority for cinematographers, if they could bring distinct styles and talents to their projects. For example, Curtis Clark spoke favorably of the film *The Aviator* (2004), which emulated the color characteristics of Technicolor two-strip and three-strip film—a system of specialized stocks and cameras no longer manufactured—using DI technology. "That was ironic," he stated, "using digital technology to emulate an old analog, photochemical technology that no longer exists." He predicted that eventually "film-look" would become one look among many:

> [Film-look] is still dominant, now what's beginning to happen is, we are saying, should that be the limitation or should that just be an option? So is it possible then to start looking in color gamuts and color space functionality in terms of the way you create an aesthetic that isn't film based at all? This is again linked back to the work flow, to the types of digital display technology that these things are going to be shown on.[261]

As this comment suggests, cinematographers were aware of the uncertain future of exhibition and the move toward domestic media consumption. The ultimate destination of their images is an important factor in decisions about image quality, as well as their role in the production. Historically cinematographers had worked as guides for productions through the arcane and often unpredictable processes of photochemically processed motion picture film. Even within professional labs, small variations of temperature in the chemistry, calibration of the printer lights, settings misinterpreted and the like could lead to starkly different results, for instance, one reel being slightly greener than the reels it would be spliced onto. Whatever the scope of production—from television to IMAX—the cinematographer was expected to recognize and intervene when these problems arose, protecting not only the creative intention of the filmmakers but the quality and consistency of the cinematography. The photochemical process could be unreliable and a threat to the consistency so valued by cinematographers. So, in the DI,

[261] Curtis Clark, interview by the author, July 25, 2005, transcript.

many cinematographers recognized the opportunity for finely graded, consistent "answer prints" from which release prints or duplications would be struck, and in this some saw a possibility for a better showcase for cinematography as an art form.

CONCLUSION

The responses of cinematographers to these new technologies should not be interpreted as a kind of technophobia. Nor should cinematographers be seen as techno-enthusiasts, despite their reliance on complex technologies. Some cinematographers are keen to understand their tools intimately, adapting and inventing along the way; others simply want tools that work in familiar, reliable ways. There is an aspect of craft that requires techno-skepticism: this is a form of work finely tuned to the prospects of any new technology to disrupt its routines and reshape the subtle landscape of creative and organizational authority in the production of motion pictures. Given the constant emergence of minor and major technological developments in the media industries, discussions of the implications of new technology are, of necessity, a major feature of such production cultures. Intensive dialogue and promotional discourse in the trade press, demonstrations, and panel discussions surround any significant new technology, not to mention untold hours of informal communication on sets, in planning sessions, chat rooms and through the healthy grapevines of craft chatter and rumor.[262] Through that process, cinematographers quickly come to see how new technologies threaten and support their professional performance.

By the late 1990s, the hazards and hopes for digital intermediate were clear. It could bring in a fresh era of creativity and unexplored, novel new looks to motion

[262] Caldwell, *Production Culture*, 151. Caldwell describes three ways that production-centered communication leads to production tools that operate "beyond instrumentalism," including through precedents set by earlier design standards, through the "distributed cognition" of collective action and workplace transactions on the set, and through "cultural performances" in which uses of technologies maintain cultural ideas about agency and function of particular crew roles.

pictures, with more consistent cinematography and better release prints. But cinematographers expressed many concerns over the new technique, which interfered with past practice by delaying or shifting key decision points about color, contrast, and other visual qualities away from the camera department, the set, and the laboratory, toward post-production and other collaborators' domains. In order to protect their craft role, some cinematographers found it necessary to stay involved with productions longer, even if this meant working for free or outside their contracted performance days. While this radical new malleability offered the possibility for more consistent and novel "looks," it simultaneously threatened cinematographers with the possibility for much *less* consistency and "unprofessional" looks that did *not* fit within the traditional practices of cinematography.

In the era of the DI, the familiar maxim that cinematographers are "guardians of the image" could easily become a misnomer and a trap. This was more than just a threat to efficiency or quality of the industry's products; such misapprehension could damage a cinematographer's reputation, especially if all the cooks in the studio kitchen were having their way with the "look," to the detriment of a credited cinematographer. The story-and-look dynamic of the director and cinematographer—the central dyad of the traditional structure of authority—was disrupted as well. Not only did the director have a new ability to shape a "look" later in the process, but likewise did the producer or studio have a capacity to supersede the director. As we shall see, when such uncertainties about authorship extended to the process of image capture, with new video and digital cameras, it led to even more pronounced conflict. This was a dilemma that cinematography as a craft community would have to face. Two films produced in the late 1990s, *Pleasantville* and *O Brother Where Art Thou*, became significant within this debate. In each of these films the overall "look" was extensively re-worked with DI and each supplied a different

argument for the role of cinematography in digital post-production. In the critical and trade response to the films, we can see how the struggle over authority and creative toolsets of media production evolves and how cinematographers were moved to take a hand in the future shape of the DI as a tool for cinematography.

Chapter 5: The Digital Intermediate and Craft Authority in Practice

In 2000, while describing the digital intermediate, an article in *Variety* noted, "there are two versions of the future of cinematography…the death knell of the collaborative process…or, Roger Deakins doing hands-on work in a digital suite."[263] Four years later, in 2004, this concern had not abated. Cinematographer Daryn Okada told an online audience at the ICG: "With the DI there are so many options for changing things that it is a must for the cinematographer to be there every second to make sure that what they and the director intended is what gets on the screen." In fact, he warned, the cinematographer must know his or her "look" before entering the DI suite to ward off the influence of others: "You need to have the look fixed in your mind before you walk into the DI, and not stray off course in a whole different direction."[264]

Pleasantville (1998) and *O Brother Where Art Thou* (2000) (hereafter *O Brother*) were among the first feature films to utilize the DI technique, thus proving, in the words of Curtis Clark, "the value proposition creatively for what ultimately became known as the digital intermediate."[265] In citing these films as examples, Clark was repeating what had by then become the standard narrative for the emergence of the DI: that it was an important new production tool and that these two films, both produced in the late 1990s, demonstrated its creative possibilities to filmmakers and the film industry. The DI had developed through the 1990s (see Chapter 4), merging several strands of technological innovation and production practice and, while *Pleasantville* and *O Brother* were among the first *features* to utilize the technique that would become generally known as the DI,

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[263]"In the post-modern approach to digital, DP stays in the loop," *Variety*, February 18, 2000, (Special Section).
[264] Daryn Okada, online chat transcript, *International Cinematographer's Guild*, http://www.icg.org, August, 28, 2004.
[265] Curtis Clark, interview by the author, July 25, 2005, transcript.

there been many other demonstrations in television, commercial, and short film production through the 1990s, along with widespread craft discussion of the technique.[266] So what makes these two films important in the emergence of DI within the craft culture of cinematography?

By describing the DI as a "creative" tool, Clark highlights one unusual aspect of the DI's R&D trajectory: its "value proposition" was not one of cost-cutting alone. Unlike many technological developments in the history of cinema (including the digital movie camera and digital projection, both coming fast on the heels of DI) cost-savings and production efficiencies would not be the primary arguments for its adoption. Indeed, the first dedicated 35mm DI workflow, Kodak's Cineon Process (and similar proprietary systems such as Colorfront, later marketed as 5D Colossus, developed by Mark Jaszberenyi**,** Gyula Priskin and Tamas Perlaki, and used to color grade *Lord of the Rings: Fellowship of the Ring*)[267], was quite expensive; the cost of a full DI could run into hundreds of thousands of dollars.[268] If the goal was to restore and re-issue a revival film from the back catalog, or save a short, scratched bit of negative to preserve a shot that couldn't be recreated, this cost was justifiable in familiar Hollywood terms (in fact, those were the foundation for Cinesite's original business model).[269] Otherwise, though, the choice to use the DI required a compelling aesthetic argument. A DI had to offer something extra, such as sharper, more transparent special effects integration or a means to create a specific look that could not be replicated in a photochemical workflow.

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[266] Using short films, test strips, and feature films as demonstration texts has been a recurring strategy in the technological history of the cinema. See, for example, Kirsner's discussion of non-linear editing in *Inventing the Movies*,Higgins discussion of *La Cucaracha* and Technicolor, in *Harnessing the Technicolor Rainbow*, Prince on *Luxo, Jr.* and digital animation in *The Pixar Touch*. In each case, a demonstration of the technique in production practice was used to shape later discourses about the purpose and efficacy of the technique.

[267] Kristen Thompson, *The Frodo Franchise* (Los Angeles, University of California Press, 2007), 280.

[268] Curtis Clark, interview by the author, July 25, 2005, transcript.

[269] Cinesite was the Los Angeles facility Kodak created to house its Cineon-based services.

Pleasantville and *O Brother* established that "argument" for the digital intermediate to producers and to key craft communities alike and demonstrated what was at stake creatively with the new technique. Moreover, these two films and, perhaps more importantly, the craft discourse that swirled around them functioned as "deep texts," explaining a craft area's processes and procedures to itself, articulating certain hierarchies and values about the division of labor and historical production practices, while serving as a visible touchstone and reminder of the possibilities and privileges of (and threats to) craft.[270]

The practices and discourse around *Pleasantville* and *O Brother* revealed an attempt to recuperate the problems of craft authority discussed in the previous chapter. This chapter will show how the DI was used to create the distinctive "look" of each film, but also how the role of the cinematographer was represented very differently in each case, and how—using the terms and concepts established in Chapter 4—those different representations reveal the particular concerns of cinematographers: their authority on the set, the appropriate amount of time to invest in a project, the number of creative "eyes" on the finished product, and the future of filmic malleability for their craft role. In other words, it demonstrated the core conflict and dilemma when craft work meets new technology: the tension between collaboration and authority.

We should keep in mind that the production context surrounding each cinematographer was different in some fundamental ways. On Pleasantville, cinematographer John Lindley was working with a successful screenwriter but first-time director, Gary Ross, on a high-concept commercial comedy financed, produced, and distributed by New Line Cinema, a division of Time Warner. The production designer, Jeannine Oppewall, was an industry veteran with credits going back to 1980. Experienced

[270] Caldwell, *Production Culture,* 26.

Hollywood hands such as John Kilik, Robert Degus, and Steven Soderbergh were credited as producers and the film was shot largely on the Warner Bros. and Universal studio lots and on locations around Southern California.[271] Unlike Lindley, who was hired onto *Pleasantville* on the recommendations of Ross's past collaborators, Deakins had an established relationship with the Coen Brothers before filming *O Brother*, having photographed five films with them previously. Likewise, the film's production designer was a three-time collaborator with the Coens. *O Brother* was a slightly outré concept that merged elements of the musical, Greek mythology, prison-break comedy, and 1930s road movie, but the Coens had written, produced and directed eight offbeat films previously, all with a measure of independence that came from seeking financing outside the studio system.[272] *O Brother* was shot on location in Mississippi and without the oversight of a studio executive. These are stark differences in the relationships of the creative team, to be sure, but it is interesting that this aspect does not enter into the craft discourse around the films; rather, it was dominated by the impact of the new digital techniques on the cinematographers' prospects for collaboration and expressiveness.

These two films are interesting avatars for this dilemma of craft, technology, and artfulness, not merely because they were "first" but because of an ironic inversion at the heart of the craft discourse around them. In *Pleasantville* a distinctive look was created by using the DI to combine color with black and white images in the single frame—a fantastical story-world that melded the mediated past with the mediated present, and in a production environment with a first-time director. And yet, in the production of the film

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[271] Leydon, Joe. "Pleasantville." *Daily Variety*, September 21, 1998, 104.

[272] James Mottram, *The Coen Brothers: The Life of the Mind* (Dulles, VA: Brassley, 2000), 41. Mottram quotes Joel Coen on seeking film financing: "There's no ideology behind these choices in as much as we can maintain the type of control we want. We can accept the finance of a studio…the problem is the conditions that are attached. The whole idea of independent production is that it helps you make the film that you want to make in the way that you want to make it. If the studio allows you to do the same thing, that's fine."

and in the discourse about it, Lindley is presented as a fairly weak figure, one of many collaborators pioneering a new technique. In *O Brother*, the DI was used to more subtle effect, establishing a seamless period look and a consistently "realistic" world that was, in many ways, a much more conventional use of the technique. And yet, although the producer-directors have a reputation that hews close to an "auteurist" sense of dominant authorship, the cinematographer, Roger Deakins, was portrayed as a key artistic voice and the film as an artistic triumph for the visual quality. The implications of these contrasting representations are several and will be discussed below, but suffice to say these differing "visions" of the cinematographer as contributor to the look and "success" of a film reveal much about the challenge that DI presented to the cinematographer community, a challenge reflected in the trade discourse at the time and for years after.

DIGITAL INTERMEDIATE IN THE LATE 1990S

Pleasantville and *O Brother* were separated by about eighteen months in their production and distribution. These eighteen months spanned a key period during which the institutional basis of the DI, key technological advances, and a developing craft understanding of the technique set the path for DI's future. Consider these differences: While the bulk of *Pleasantville*'s post-production DI work was completed at a custom-built facility that allowed the filmmakers to scan and manipulate the film's colors frame by frame (with Kodak's Cinesite facility performing only the final grading and printing), *O Brother*'s entire post-production process was completed at Cinesite, a "one-stop shop" for the process.[273] In many ways *O Brother* served as a key demonstration of the Kodak's Cineon digital workflow for feature production, performed, significantly, under the

[273] For this and the comparisons that follow, see Bob Fisher, "Black and White in Color: The Comedic Fantasy *Pleasantville* Provides a Unique Opportunity for the Digital and Photochemical Production Worlds to Merge," *American Cinematographer*, November 1998, 60-67; Bob Fisher, "Escaping from Chains," *American Cinematographer,* October 2000, 36-49; and Bob Fisher, "Images for the Ages: Roger Deakins: *O Brother Where Art Thou*," *American Cinematographer*, June 2001, 102.

guiding hand of a recognized "master cinematographer," and accompanied by a wide marketing effort by Kodak. At the time of *Pleasantville*'s post-production, the maximum workable resolution for scanning a frame of film was 2K (i.e., 2048 lines of resolution). By the time of the *O Brother*'s release, debates were raging about what level of digital resolution (2K, 4K, 6K, or 8K) would adequately replicate 35mm film quality, a distinction often summed in the phrase "film-look." Although Deakins cited *Pleasantville* as his inspiration for choosing the DI process, he also cited the need for improved frame resolution of DI before it would achieve a polished "film-look." Nonetheless, Deakins went ahead with 2K resolution. *O Brother* and *Pleasantville* alike were marked by lengthy post-production phases, awkward moments in establishing their workflows and, in Deakins' words, considerable "trial and error."[274]

Over the next decade, craft workers would continue to debate, refine, and attempt to standardize the DI within post-production contexts as well as the role of the cinematographer within them. According to Charles Swartz, the concept of "look management" emerged in this period as a solution to the persistent problem of protecting "creative intentions" through this process:

> How does the cinematographer communicate what it is that they were trying to achieve, on the set, with all of those people in post-production, now that the image is going to float through their hands. That is why this idea of Look Management has grown up. The notion being there is a certain look that the cinematographer is achieving and it is not only color. It's density, it's contrast, it's the way the lighting looks.[275]

When the ASC's technology committee was formed in 2002, it took as one of its first tasks the development of a "Color Decision List" (CDL) procedure, which attempted to standardize communication between manufacturers, cinematographers and colorists.[276]

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[274] Bob Fisher, "Escaping from Chains," 36.
[275] Charles Swartz, interview with the author, March 27, 2005, transcript.
[276] Carolyn Giardina, "Color Code has ASC in the Pink," *The Hollywood Reporter*, June 22, 2007.

The specification was introduced in 2006. Stephen Lighthill described the ASC's intervention into the "color conundrum" as a necessary step into the gap:

> Nobody cared about that, but now that we've said they should—here is an ASC digital color mix, a language, that we are encouraging people to build so that the word digital doesn't become a curse word. Because part of the problem right now is there is no archive for metadata which is part of color correction for television shows or DI, so we've found a place in [the ASC] answering those needs.[277]

Even in 2000, then, the DI had a long way to go toward being a commonplace, formalized technique. Nonetheless, despite their early appearance, these two films became key texts that demonstrated the extent to which cinematographers would be grappling with the implications of frame-by-frame manipulation of images in the feature film context.

THE DI IN *PLEASANTVILLE* AND *O BROTHER WHERE ART THOU*?

Pleasantville is an allegorical comedy-drama of two modern teenagers, David (Tobey Macguire) and Jennifer (Reese Witherspoon), sucked into the black-and-white world of a 1950s domestic sitcom. The audience follows David and Jennifer from their contemporary, full-color lives into the black-and-white, small town milieu of the sitcom "Pleasantville" via a magical remote control. Their actions and suggestions to the townspeople of Pleasantville soon lead to objects turning to color: first, a rose, then, in order—numerous indices of love and romance—bubble gum, red hearts, and most dramatically, a rise of color in the face of their sitcom mother (and her house-wares) as she discovers her own sexuality in a bathtub, a scene that ends when the black-and-white tree in their suburban yard explodes in yellow flames. Before long, a repressed soda shop owner is learning to paint in color. The youth of the city discover the library, jazz music, and a "Lover's Lane" on the edge of town, and the more they experience, the more

[277] Stephen Lighthill, interview by the author, August 20, 2005, transcript.

colorful they and their world become. Social tensions rise as David and Jennifer (now Bud and Mary Sue) introduce sexual openness, female liberation, modern art, and other contemporary ideas into the sanitized sitcom village. Eventually individuals (mostly young people) begin to turn to color and the differences lead to a violent backlash by the reactionary traditional (i.e., black-and-white) characters against the "colored," multi-hued characters (See Figure 3 through Figure 6).

The distinctive combination of color and black-and-white in *Pleasantville* was achieved by shooting the entire film in color, scanning all of the scenes set in Pleasantville into digital form, converting them to black-and-white, then adding color back into the objects and people as the script prescribed. The central cinematographic effect in the film is of a black-and-white world slowly turning to color as discovery and fading repression leads to a more interesting, engaging, modern, "colorful" world. This fantastical notion moves the film's narrative from a contemporary realistic mode in its earlier scenes into the realm of allegory and, in the words of film's director Gary Ross, fable.[278] The two "looks" in the film—color and black-and-white—come to stand in for the animating tensions of the story, local versus cosmopolitan values, stability versus progress, and the traditional versus the modern.

Whereas *Pleasantville* appears to move its characters through time, *O Brother's* characters are resolutely stuck in the past. *O Brother* is a prison break comedy that follows Everett Ulysses McGill (George Clooney) after he bolts from a prison gang and tries to return to his home and family, pursued by a supernaturally menacing Sheriff and aided (or sometimes confounded) by two incompetent fellow escapees. Very loosely

[278] Bob Fisher, "Escaping from Chains," 36.

Figure 3. One of the first appearances of color in *Pleasantville*. Jennifer/Mary Sue (Reese Witherspoon)'s pursuit of a more "modern" romance with her boyfriend leads to a breakout of color around them. A shot like this was captured on color film, digitized, drained of color (with some adjustments to contrast and hue), and color added back to selected objects.

Figure 4. A tree explodes in yellow flame when Betty Parker (Bud and Mary Jane's sitcom mother) discovers sexuality. The burning tree foreshadows the familial and social turmoil that would follow. Note the yellow reflected light on the house and flame in the window.

Figure 5. David/Bud (Tobey Maguire) and his Pleasantville girlfriend, Margaret (Marley Shelton). Bud's nostalgia for the "innocent" pre-modern world of Pleasantville leaves him black-and-white as others in the town are turning to color. Note the different quality of shadows on each face—sharper modeling as is conventional in black-and-white portraiture and softer, rounder modeling for color.

Figure 6. According to cinematographer John Lindley, creating lighting that preserved conventional modeling for black-and-white and color characters in the same frame was one of his most significant challenges. Still, mingling black-and-white with color characters created some sharply unconventional images in *Pleasantville.*

based on the Greek epic poem, *The Odyssey*, the film mingles off-kilter flights of illogic and a tone of light magical realism against the backdrop of seeming social realism in the Depression-era Deep South.

Color is a significant aspect of the style in *O Brother* as well. For instance, it does mix monochrome with color, briefly, and in an entirely different manner than *Pleasantville*. Rather than mixing objects within a single shot, *O Brother* uses a monochrome image as a framing device for the plot, beginning with an establishing shot of a prison work gang breaking rocks along a country lane—not in a traditional, silvery black-and-white as seen in *Pleasantville*, rather in a faded, faintly yellowed, high-contrast image that recalls an archival print from the era of orthochromatic film in the early days of the film industry. As the camera tracks right the shot becomes suffused with a sepia tone, establishing the dominant palette of the film—a de-saturated, washed-out look based on yellows, browns, and other "dusty" nature tones. The final shot of the film reverses this opening effect, closing with a medium shot, in color, of one of Everett's daughters stopping on a railroad track. She gazes down the track and then walks out of frame as the camera cranes upward and the image shifts to the orthochromatic look. Rather than functioning as an animating device within the diegesis (as in *Pleasantville*) the mingling of monochrome with color in *O Brother* serves to invite the audience into—then excuse them from—the historical milieu. (See Figure 7 and Figure 8) The effect also functions as a showy piece of cinematographic wizardry. Moving between color and black-and-white within the span of single shot is a relatively easy process in a video- or digitally-based workflow—and thus, more commonplace in television or advertising production—but the creation of such a shot with a high quality of color, resolution, and contrast is enormously complicated and expensive in a photochemical workflow. The ability to replicate archaic looks such as the orthochromatic fascinates many

cinematographers and was one of the appeals of the DI, as, for example, when Curtis Clark praised *The Aviator*'s (2004) emulation of old Technicolor two- and three-strip processes (see Chapter 4).[279] Like *The Aviator*, *O Brother* opens (and closes) with a nod to cinematography and its storied past, an implicit aesthetic argument for putting DI in the hands of a master cinematographer.

Figure 7. Beginning of the opening shot of *O Brother Where Art Thou*. A high contrast/ monochrome image that recalls an archival print from the orthochromatic stocks of cinematography's storied past.

After this memorable opening, the predominant use of DI in *O Brother* was in shifting the tonal values of the entire film, away from the lush, summer greens of the Mississippi locations and toward the stylized yellows and browns of the mytho-historical Deep South setting (See Figure 9 through Figure 12). Different scenes required different degrees of manipulation, some hewing closer to a more-or-less faithful rendering of small towns and farms, others being more expressionistic.

[279] Curtis Clark, interview by the author, July 25, 2005, transcript.

Figure 8. End of the opening shot of *O Brother Where Art Thou*. As the camera tracks, the monochrome image is replaced by the film's dominant palette of yellows and browns.

Pleasantville and *O Brother* used largely the same techniques and similar technologies to achieve their looks. Both films were shot on color film, using essentially traditional color 35mm production methods on the set, and edited as color films (that is, prior to "finishing" the look). Both films used the same technology of scanning the original into digital form, revising, then printing back to a 35mm "answer print." In these ways, the films owe much to the classical Hollywood mode of production.

Likewise, discussions around developing the style resemble many other productions. Both cinematographers claimed to be inspired by old hand-tinted photographs and postcards.[280] *Pleasantville*'s debt to the old technique is more obvious, as the filmmakers selectively added color to predominantly black and white images—a practice rooted in early photographers' efforts to add verisimilitude to their photography through "tinting." However, *O Brother*'s use of monochrome and sepia are more strictly

[280] See Fisher, "Black and White in Color" and "Escaping from Chains."

Figure 9. The "baptism" scene in *O Brother Where Art Thou* as shot on location. Note the green trees and bushes, reflected sky light in the river, and blue-toned daylight hues in the worshipers' white smocks.

Figure 10. "Baptism" scene as it appears in the film. Greens and blues removed; replaced by yellows, browns, and "dusty" whites of the films signature "dust bowl" look.

Figure 11. *O Brother Where Art Thou*. The "siren" scene before DI processing.

Figure 12. *O Brother Where Art Thou*. The "siren" scene after processing.

conventional. Faded, yellowing photography is not a style rooted in photographic practices of the past; it is rather the product of a technological weakness (the asynchronous fading of dyes in old prints over time) that has become a contemporary signifier for particular historical periods, nostalgia, or more generically, "the past." *O Brother*'s opening orthochromatic gambit and the overall palette of the film is, like *Pleasantville*'s faux 1950s sitcom, a reflexive device, but it is of a piece with the more ironic, knowing tone of the entire project. The techniques are the same, but these films' use of DI differ sharply—in *Pleasantville*'s case harkening back to the gee-whiz history of television with a precocious, cinematographic special effect, while *O Brother* gestures to the color of cinema history itself and the audience's reception of it. Still, both films are participating in the turn of cinematic style toward increased experimentation and intensified, reflexive treatment of historical looks and styles that accompanied late 20th century cinema, thanks in part to digital production tools.

REPRESENTATIONS OF AUTHORITY I: JOHN LINDLEY

John Lindley, ASC, photographed *Pleasantville*.[281] Representations of Lindley in DVD materials, trade press accounts, and interviews with other cinematographers suggest that *Pleasantville*'s experimental look was seen less as the work of Lindley than of the film's special effects personnel. By contrast, the look of *O Brother* is celebrated as an award-winning work of cinematography in which Roger Deakins' contribution is generally unquestioned. The difference between these representations reveals both a continuum of creative possibility and practice that was emerging in this period, and a sense of the strategies of craft workers when faced with a threat to traditional or established routines of authority.

[281] Lindley was not a member of the ASC at the time of *Pleasantville*'s production.

In general, representations of Lindley's role on *Pleasantville* implicitly position his work as that of a collaborator, one among many other designers and technologists. For example, Bob Degus, the film's producer, and Michael Southard, the film's color effects supervisor, do the bulk of the descriptions and demonstrations in the DVD feature on the making of the film, including explaining how the distinctive look of the film was created (See Figure 13). Southard and Degus are interviewed in the *Pleasantville* production office and they speak in great detail about the complicated makeup and post-production techniques necessary to produce the color and black-and-white effect in the movie, including a lengthy description of the procedure that allowed actress Joan Allen to smear her "black and white" skin, revealing the color underneath, among other demonstrations of the digital techniques. (See Figure 14)

Figure 13. from *Pleasantville*'s "making of" DVD feature.

Figure 14. In this scene, seen here prior to DI processing, Joan Allen (Betty Parker) wipes her tears, smearing color-balanced green make-up onto her face. In DI processing, the color images were replaced with black-and-white and the green makeup replaced with skin tone, to create a scene in which Betty wipes off black-and-white make-up that is hiding her "colorful" face.

By contrast, John Lindley is presented in a shorter, later segment the feature. He is presented sitting in what appears to be in his own home, perched barefoot on a couch. (See Figure 15) Lindley's segment is much less structured, more conversational, and focuses primarily on his lighting solutions for having black-and-white and color actors sharing the same frame. (See Figure 5 and Figure 6) Lindley casts this problem as a clash of cinematographic traditions: the conventional modeling of faces in color being distinct from that in black-and-white photography. Lindley doesn't abandon the traditions, but describes some clever solutions using dimmers and careful choreography of camera and actor to maintain the appropriate lighting conventions. Similarly, Lindley discusses protecting the verisimilitude of the visual experience through defining the quality of reflected light in certain shots. For example, in the "exploding tree" scene, he had to ensure that the flickering light and reflected flames in car and house windows would match the digitally-created yellow fire—a way of "seeing light" that Lindley ascribes

Figure 15. Cinematographer John Lindley, ASC, from *Pleasantville*'s "making of" DVD feature.

specifically to cinematography. (See Figure 4) After this discussion of key lighting moments, Lindley rather anti-climactically pages through a book of storyboards the director gave him as a gift after the production.[282]

The pattern of highlighting Lindley's collaborative and problem-solving role was repeated in *AC* in a prominent feature on the making of *Pleasantville* titled "Black and White in Color," and subtitled "a unique opportunity for the digital and photochemical production worlds to momentarily merge."[283] The title of the feature speaks to the perceived mystery and importance of emerging digital technologies, even as the word "momentarily" in the subtitle indicates how opaque that digital future still was to cinematographers. Remarkably *Pleasantville* was not the cover story, perhaps because in the *AC* article, as in the DVD material, the post-production procedures of the DI are

[282] Lindley describes the storyboards as collaboration between himself and Gary Ross.
[283] Fisher, "Black and White in Color."

highlighted over the cinematography.[284] The statements of director Gary Ross, producer Bob Degus, color effects supervisor Michael Southard, and visual effects supervisor Chris Watts take precedence, along with descriptions of some of the film's 1700 "visual effects" shots (i.e., shots adjusted through the DI process). Lindley reports on the closeness of his collaboration with Southard and makes a few statements about life on the set, and finally hits the professional bases common to all *AC* articles (such as sponsor testimonials, describing what cameras and lenses he used) and, as on the DVD feature, about the difference between lighting for black-and-white versus color.

Much of the *AC* article is given to exploring the complications of coordination and decision-making on what is described as a "hybrid movie." The authority of visual effects personnel on the film was apparent in the post-production processes, but it is made clear that their influence extended onto the set and into pre-production as well. Such mingling of authority in new locations was not an entirely new phenomenon, but the need for *AC* to discuss them reveals the increasingly complicated interweaving of authority that was changing within the traditional pre- to post-production industrial sequence: new workflows require working out thoroughly in advance, and traditional decision points are no longer confined to their customary craft area.

The decision to use color film stock in the production of *Pleasantville* provides an instructive example of this process. In the *AC* article, Lindley describes the process of choosing the film stock—a decision that typically falls primarily to the cinematographer—as requiring extensive tests and discussions with Gary Ross and other personnel. The most obvious workflow would be to use black-and-white stock to film the sitcom segments of the script and add color at the appropriate spots. However, several

[284] On the cover that month was the film *Velvet Goldmine*, a low budget feature photographed by Maryse Alberti. Her cover story was the first time a woman cinematographer's work had appeared on the cover of *AC*. Neither John Lindely nor Maryse Alberti was a member of the ASC at the time of these feature articles. Alberti still is not.

aspects of the workflow forced the production away from using black-and-white stock.[285] When Lindley and Ross discovered (through "many tests," according to *AC*) that digitally scanning the black-and-white negative exacerbated these shortcomings, the stock was deemed too "soft" and the production team decided to use color film. Lindley said, "by the time it was run through a recorder, it wouldn't be sharp enough to create the feeling of reality we wanted."[286] In other words, color stock was judged a "better" stock for transfer for digital post; it retained a sense of verisimilitude sought by the production team. Also, because the film's plot is book-ended with color sequences set in the contemporary period, intercutting color with black-and-white stocks was described by the film's colorist, Richard Cassel, as creating "conflicts" in grain and sharpness.[287] This admittedly technical detail reveals the emerging reality of digital production: decisions about *look* that could heretofore be left to the discretion of a cinematographer must be considered through the whole course of the workflow and thus, by many more members of the production team. There were many more "eyes" in the process.

Lindley was also concerned about the colorizing technology used to add colors back into his black-and-white images (the actual color having been removed by the special effects team). Colorization has been a controversial subject to cinematographers since at least the mid-1980s, when mogul Ted Turner decided to convert the black-and-white films in his MGM back catalog holdings into color, in preparation for broadcast on the Turner cable networks. Cinephiles and cinematographers protested loudly, if ineffectually, and among my informants the outrage was still fresh fifteen years after the fact. Curtis Clark, speaking about Ted Turner and colorization, said:

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[285] Most significantly, the sharpness of 35mm color film stock was much greater than that of black-and-white stock. Because black-and-white stock is in less demand than color stock, over the decades it has fallen behind in terms of image sharpness, grain structure, and other qualities prized by filmmakers, especially for special effects integration.
[286] Fisher, "Black and White in Color," 61.
[287] Ibid.

> He was fucking around with our cultural heritage. And he had no right to do that, because these, it was almost like the people rose up and said these films were shot in black and white that was the creative intent that was the way these films were meant to be seen and by damn, damn it, that is the way we should be seeing them.[288]

Thus, in adopting a "colorization" technique, Gary Ross and his producers were merging areas of practice not only technologically distinct, but viewed with hostility by most cinematographers on aesthetic grounds.[289] Moreover, Michael Southard, the color effects supervisor on *Pleasantville*, was a former Senior Designer at American Film Technologies, the San Diego firm hired by Turner Pictures in the late 1980s to colorize that "cultural heritage." Even if by the mid-1990s colorization techniques had become standard practice in commercial and music videos, they were still not an aspect of live-action feature film production, so the presence of a "colorization" expert on a film set was understandably cause for comment and even suspicion. Lindley is described as discussing with Southard ways to use colorization that won't "take all the oxygen out of the film."[290] However, colorist Richard Cassell, in a revealing comment, describes a close collaboration with Southard, stating, "Michael was essentially pre-timing the negative…he'd show me what colors in the mural were critical, and we'd concentrate on getting them as close to what he envisioned as possible."[291] This anecdote suggests that the color effects supervisor's "vision" of the final look held at least as much sway as Lindley's.

Clearly, to some degree Lindley's contribution to *Pleasantville* was complicated by the film's complex workflow and elaborate post-production. It is difficult, though, to

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[288] Curtis Clark, interview by the author, July 25, 2005, transcript.
[289] Belton discusses the "discourse of colorization" around the DI and *Pleasantville* specifically, in John Belton, "Painting by Numbers: The Digital Intermediate," *Film Quarterly* 61:3 (Spring 2008), 58-65.
[290] Quoted in Robert Allen, "A Brief History of Digital Film Mastering—a Glance at the Future," *ICG Digital Domain* <https://www.cameraguild.com/member-resources/techtips/the-digital-domain.aspx>, Accessed August 11, 2011
[291] Fisher, "Black and White in Color," 61.

trace the day-to-day workings of production through trade reporting and public relations announcements and I don't want to overstate how much Lindley's authority may have been compromised in this production. Nonetheless, in a "Tech Tip" feature about digital mastering published on the ICG website, Lindley hinted at these new fault lines in his work environment:

> There is a new player in our universe. In some movies, the visual effects supervisor is just the person who does stuff with the monster and tries to make it look real. But on movies like *Pleasantville*, they can have an effect on contrast, brightness and all the things that the cinematographer normally controls. I was very lucky that Chris and his team were blessed with a creative aesthetic and respected my work…who knows what will happen with people who don't have that talent?[292]

That carefully cautionary tone is about as close as any working cinematographer will come to sounding an alarm, at least in a public forum. It was echoed the next year when cinematographer Caleb Deschanel warned *AC* that the balance of power in the industry was shifting: "The real footage that is shot is like brush strokes," he said, "the cinematographer's work is becoming part of a mosaic. The weight has shifted more to production design and to the editorial and visual effects house." The article concludes that a cinematographer "has to stake out that territory or risk losing the opportunity to contribute."[293]

These statements reveal a great deal about the need for cinematographers to show collegiality for their collaborators and express their collective interest in the well-being of the show, while also acknowledging, to some degree, the finite real estate of authority in production. Making meaningful, creative decisions is the lingua franca of people in the crafts. As the division of labor develops more specializations the ability to make decisions that stick becomes a kind of zero-sum game in which the decisions you *no*

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[292] See Allen, "A Brief History of Digital Film Mastering…"
[293] Stephanie Argy, "Cinematography's Computer Age," *American Cinematographer*, August 1999.

longer make transfer to other aspects of the workflow. Even in cases where the new abilities may be "additive" in the sense of new aesthetic capacities, that loss of control is a felt aspect of work in craft areas. Who makes the last decision? Undeniably, for Lindley and other cinematographers, colorists and visual effects supervisors—formerly junior members of the creative team—had taken on new significance, new powers, and new creative authority, thanks to the malleability of the image.

REPRESENTATIONS OF AUTHORITY II: ROGER DEAKINS

The representations of John Lindley as a collaborator and creative team member contrast sharply with those of Roger Deakins, the cinematographer of *O Brother Where Art Thou*. *O Brother* was released in 2000 and is often held up as another major turning point for DI, an influential demonstration of the promise and problems of digital post-production. As described above, DI was used to shift the overall tonal values in the film, creating a continuous and consistent overall look. As a look, though, this is much less obvious and distinctive than the unusual blending of color and black-and-white characters and objects seen in *Pleasantville*, and, indeed, for many viewers the coloration of *O Brother* may have passed unnoticed as a special or unusual effect at all. Nonetheless, Deakins was presented in copious trade commentary and in the DVD making-of materials as the architect and author of the film's washed-out, period look, which was almost universally hailed as an aesthetic and technological triumph. Curtis Clark called Deakins the "guinea pig" for DI and stated, "he was able to create a look, using Cineon, and that was a significant part of the success of that film."[294]

Deakin's professional reputation provides one explanation for the different representations of his and John Lindley's work. As a figure within the craft culture of cinematography, Deakins was simply more widely known than Lindley. At the time *O*

[294] Curtis Clark, interview by the author, July 25, 2005, transcript.

Brother was filmed, he was already member of the ASC. He had won several awards for his work on well-regarded films such as *The Shawshank Redemption* and *Fargo*, as well as three Academy Award nominations.[295] In other words, Deakins was a recognized "master" of cinematography and trusted member of the Coens' creative team before the production began, and his decision to adopt the new digital intermediate technique was news for that reason alone.

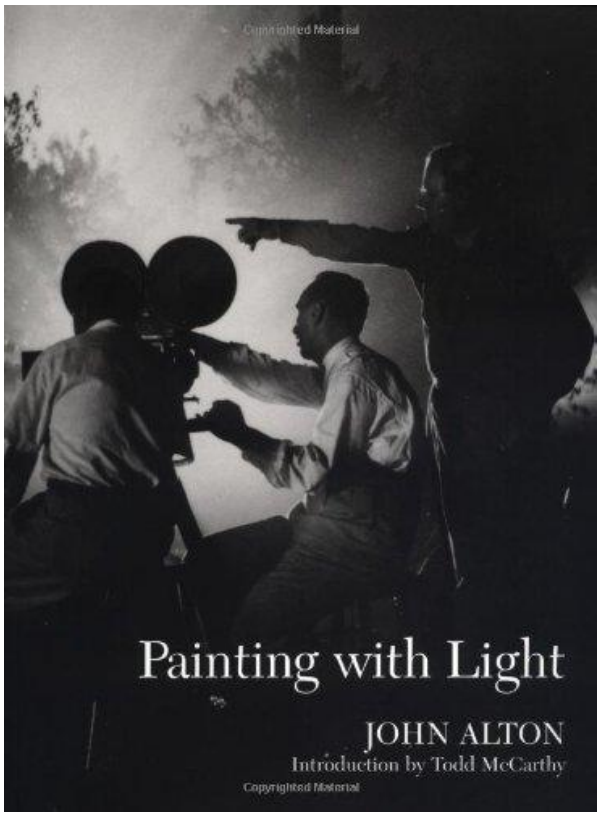

Figure 16. John Alton's influential manual for cinematographers.

Still, throughout the production of the film and the trade discourse that surrounded it, Deakins evokes his authorship in numerous ways that serve as a counterpoint to the muddled discourse of collaboration and deference that surrounded

[295] Deakins has been nominated eight times for Academy Awards and never won, a remarkable streak that may owe something to his controversial willingness to adopt and promote new technologies.

Lindley. For example, on the DVD release for *O Brother*, one feature is devoted entirely to Deakins and the role of DI in the production. The feature was called *Painting with Pixels*, the title a bold reframing of Alton's *Painting with Light.* (See Figure 16) *Painting with Light* has been enormously influential as a manual of technique and aesthetics, written by a working cinematographer in non-technical language, but with numerous illustrations and diagrams to guide cinematographers toward visually pleasing solutions to the everyday problems of photographing motion pictures.[296] The influential 1992 documentary *Visions of Light: The Art of Cinematography* also nods in the direction of Alton's book. Titling the *O Brother* DVD feature in homage to these earlier works was at once an act of confidence (if not hubris) and one that acknowledged the significance of the new technique.

Whereas *Pleasantville*'s "making of" feature places Lindley on a couch in a non-professional setting, *Painting with Pixels* contains ample video and still images of Deakins in authoritative positions: behind the camera, speaking on the set with Joel and Ethan Coen, directly addressing an interviewer while seated in a screening room, as well as, significantly, I think, working in a DI suite, guiding the work of (presumably) a digital colorist who is young and female [see Figure 17].[297]

Images like this were significant in the developing negotiation over craft authority around DI in Hollywood. As Caldwell has argued, in an industry excruciatingly aware of the importance of images and steeped in the blending of promotional, aesthetic, tradecraft, and personal discourses, there are very few unintended performances in images like those I've described here.[298] The DI suite was potentially a new workspace for cinematographers or, in more cold-blooded terms, a new battleground in the constant

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[296] See Chapter 3 for further discussion of Alton's *Painting with Light*.
[297] Nearly all of the highly sought colorists in Hollywood are men.
[298] Caldwell, *Production Culture*, 302.

struggle for authority in this system. Through performances such as this, cinematographers (and others) learned that the traditional locus of authority, the raucous workshop fraternity of the film set (portrayed in evocative shadows on the cover of

Figure 17. Roger Deakins at work in Cinesite's Digital Intermediate facility.

Painting with Light), is extended into the carpeted, digital the quiet of post-production suite. The familiar authoritative poses and gestures of the cinematographer, for whom the right "to point," i.e., to direct a crew, is a hard-earned prerogative; these gestures are no longer confined to a zone circumscribed by lighting instruments and the motion picture camera. The cinematographer can make a home—and an impact—in post-production.

Contrast this representation with the other established post-production role players, especially in contrast to *Pleasantville*: the colorists, lab personnel and editors of *O Brother* go relatively unmarked.[299] Between these two films, there has been an apparent shift. Cinematography's craft identity, bound up as it is with images of vigorous men (and some women) in remote (or at least, industrial) settings, doing the work of

[299] The editor of *O Brother* was Roderick Jaynes, a pseudonym taken by the Coen Brothers. See Michael Fleming, "Edited by Alan Snipee" *Daily Variety*, February 13, 1997, 1.

cinema, successfully transfers an aspect of its expertise into the domain of post-production and creates an interesting clash of production cultures.

Deakins is abetted in this performance by the Kodak Corporation. Kodak is a historically close partner of cinematography, a manufacturer and service provider whose history and traditions are inseparable from that of cinematography. But they are a partner, as pointed out in Chapter 4, whose intentions cinematographers came to question after Kodak's turn toward digital research and development in the early 1990s. If the *Painting with Pixels* feature is in some ways an extended commercial for Kodak's Cinesite, it also feels like an attempted reconciliation. Cinesite provides the backdrop, technology, and personnel-actors for Deakins' labors. The implicit message of the feature is this: Kodak has not abandoned cinematography as a craft, and we will always work to preserve the unique contribution of cinematographers to the art form.

Kodak and cinematographers' relationship is tangled and complex. One of the key affordances of digital production tools—starting with the DI, but then accelerating with digital movie cameras a few years later—has been toward delaying decisions, maintaining aesthetic "flexibility" to the last possible iteration of a project. This flexibility has often come at the cost of less operational flexibility on the set: using unfamiliar cameras, film stock, or other recording media, for example, or the need for "video villages" to monitor scenes as they are captured, or the need for more consultation with other craft areas such as production designers, special effects personnel, colorists, editors, and other post-production specialists. Thus the "flexible" new tools undermine a division of labor in which craft areas thrive or wither based on their ability to make decisions that stick, decisions that cannot be "undone" by later iterations of the workflow. The alliance between Kodak and cinematography, of course, being built around film stock and photochemical processing, had been a celluloid shield that preserved

cinematography's craft authority for decades. However, since the early 1990s, Kodak's desire to maintain its relevance as a service provider in the digital media industries—not an easy task—came into conflict with its desire to protect the craft authority of that primary client group, the cinematographers. Kodak's celebration of Deakins' authority in *Painting with Pixels*, then, could appear to some observers as the clutching of two sailors swept into the digital tsunami. They needed each other, at least for the moment.

In *Painting with Pixels*, Deakins opines about the future of cinema, at one point calling film labs a "restrictive" and "archaic process" that would not allow him the fine-tuning necessary for *O Brother*'s look. For instance, when Deakins describes the "siren" scene, in which the escaped convicts are mesmerized and seduced by three women singing and washing clothes in a river, he states that the DI allowed him to subtly adjust the saturation of the colors within this scene (already altered from lush green to dusty sienna and brown) to creating a contrast between shots in the early, intense moments when the characters are bewitched, and the later moments when the men wake up, robbed and with one of their number apparently turned into a toad. In the early shots the colors are deeper and more vivid while the later shots are less intense, more muted, drained. (See Figure 18 and Figure 19) Deakins describes these rather subtle adjustments as coming from his own sense of the psychology of the characters and meanings in the narrative. He goes further still, stating that, "Joel and Ethan [Coen] didn't even want to see the original print," because the color quality looked so unlike their vision of the film's look.[300] It is hard to verify this claim, and the precise order of the workflow is difficult to reconstruct, but Deakins' characterization of the workflow conflicts with *AC*'s descriptions in which the Coens edited the entire film prior to the DI processing (i.e.,

[300] From *Painting with Pixels*

Figure 18. Everett Ulysses McGill (George Clooney) greets the sirens.

Figure 19. Everett wakes up after being bewitched. In this scene, not only are the greens and blues removed [see Figure 9], the DI allowed Deakins to adjust colors within the scene to support the psychology of the characters—starting with richer, more saturated tones when the men are under the spell of the sirens' song (Figure 18), returning to the faded, spent, dusty colors in Figure 19 when they wake up.

before Deakins' color adjustments were made).[302] The latter description makes more sense given the high cost of the DI; the producers were unlikely to spend money creating DI shots that would not be included in the final edit. Joel described the process of creating the look this way:

> It was our idea to de-saturate the colors in talking to Roger. It was Roger's idea to try to do it in the computer. It had the effect of giving the film the look of an old tinted photograph or postcard, or something like that. It also removed the world from reality in a way that was interesting. It was in keeping with what we were trying to do.[303]

Whatever the order of events, this quotation gives a sense of their collaboration: a rather imprecise concept from the brothers, and a proposal that was at once aesthetically inventive and technologically adventurous from Deakins. What I find interesting in these statements is the representation of authority it promotes. Deakins (and Joel Coen) is making a rather commonplace claim about cinematographers' primary responsibility—to create and safeguard his images, stimulate visual interest, and contribute to the conventional narrative strategy of psychological realism. But, significantly, he is extending that claim into post-production and specifically the DI process. This "trade story," in Caldwell's sense, matches the visual rhetoric of the clips that show Deakins directing the action in the DI suite.

This expansive representation of Deakin's authority was also present in *AC*'s long feature about the production of *O Brother*. The article is titled, portentously, "Escaping from Chains," a pun on the film's story and a none-too-subtle allusion to the promise of digital intermediate for extending the creative authority of cinematographers. The article consistently foregrounds Deakin's authorship of the film's look, describing him at one point conducting extensive test shoots in Griffith Park in Los Angeles, trying out

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[302] Bob Fisher, "Escaping from Chains." 36.
[303] Quoted in Mottram, 157.

established laboratory techniques to reach the "picture book" look the Coen Brothers had requested before settling on the personnel and technology at the digital facilities of Cinesite. After principal photography, Deakins is said to have spent ten weeks in post-production fine-tuning the look of the film, an unheard-of luxury for any cinematographer. Even in 2006, the "Deakins deal" was still cause for comment:

> I think part of the fight now is getting paid for [post] because that means a few people—like Roger Deakins certainly got paid for post by the Coen Brothers—but we are required now to have so much input in their process that contracts have to be redesigned to accommodate the cinematographer's involvement.[304]

Given the anxieties about time and compensation that pre-occupied cinematographers faced with digital cinematography (and would continue to bedevil them in the years to come), Deakins' experience would seem a kind of "best practices" alternative to delegating this work to the colorist—an optimistic portrait of an "appropriate" investment in the work of the cinematographer.

CONCLUSION

What stands out in these examples is the centrality of Deakins' authority around the look of *O Brother* and even the future of motion picture imaging. Deakins is presented as collaborating with the Coens but also as the architect and creator of the "look" of the film. In the *Pleasantville* making-of feature, Lindley is figured as much more the technician, the problem solver, one of many collaborators, and even then, a secondary figure within that team. In *O Brother*'s material, Deakins is a, if not *the*, key artistic voice. Other figures—producers, colorists, effects supervisors, even the Coens themselves—are pared away from the process, leaving Deakins a clear title to his artful practice. Via these representations, Deakins is able to wield his considerable craft authority—as a star in the firmament of cinematography, an experienced DP, a friend of

[304] Robert Primes, interview by the author, August 23, 2005, transcript.

Kodak, and someone with the apparent confidence of his director-collaborators—as a kind of intervention in the meaning of this term, digital intermediate. By explicitly performing the "master cinematographer" role, he and other organs of the craft culture of cinematography—Kodak, the ASC, *AC*—attempt to enfold this new technique into the practice of cinematography.

It bears repeating that most cinematographers would see Lindley's collaboration and deference on *Pleasantville* as necessitated by the nature of the production. The narrative was unusually reliant on the special effect of mingling color with black and white; there was the challenge of developing an untested workflow in a custom-built facility, and the particular, perhaps singular importance of the color specialists, make-up artists, and so on to the story. As one informant told me, "You can't separate the visual qualities from the practicalities of shooting the film."[305] We might find a parallel in the early days of Technicolor, when the requirements of the color specialists forced cinematographers to abandon expressive lighting for the flat, even light that the Technicolor process required to work. Lindley was simply doing what a professional cinematographer should, which is assessing the needs of a production and providing the best service possible. Soon after, though, an alternative craft example emerged. In this case, Deakins enjoyed a greater range of authority by virtue of his collaborative relationship with the Coen Brothers, his ASC-pedigree, and his track record of creating distinctive looks in other productions. Based on these, cinematographers would say, Deakins can rightly make stronger claims about his artistic contribution to *O Brother*.

I am not discounting these explanations. Likewise, I am not debating the merits of the photography in these films, or weighing the abilities of Lindley and Deakins. What interests me is the negotiation over creativity and authority in these systems and how

[305] M. David Mullen, interview by the author, August 15, 2004, transcript.

technologies disturb settled hierarchies and craft roles. The necessity of asserting authorship in constrained ways is a constitutive part of craft practice, but the reality of creative partnership is a source of comfort for some cinematographers:

> A few years ago I might have told you cinematography is going to be dead because they're going to come up with these digital cameras that can do it all, and fix the rest with CGI. But that's not the reality of making good films. When you are on the set you are the director's ally and sometimes it seems like you're their big brother. Sometimes I look at a CG shot and I could swear it is real. Other times the spontaneity is missing. Unless you retain the integrity of the artistic idea, you strip away the emotions. I think when the novelty wears off there will be a push to do as much as possible in original photography and then involve the cinematographer in the digital suite.[306]

In 2003, Dante Spinotti described just such a relationship with director Michael Mann: "I think most directors are going to want their cinematographers, who intimately know the intentions of the images, there during digital timing sessions. I don't see digital timing as a threat."[307] In tracing these claims as a sort of negotiation with—rather than deference to—other kinds of authority, I want to highlight how authority in this system is mobile, not just in the so-called creative areas but in the crafts as well. The claim that a narrative "demands" particular structures of authority in the craft areas is an almost completely naturalized concept within film and television production (and some critical approaches), but it masks the degree to which existing, historically specific structures of authority, such as craft, design, and perhaps other, more technical domains participate in and condition the narrative and stylistic possibilities of cinema and television.

These two films became important as shorthand for talking about digital intermediate and digital cinema because they reveal that structuring tension between the technical, deferential aspect of craft work and the expressive, authoritative aspect. If the DI was, as Curtis Clark described, a "value proposition," these films asked: what sort of

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[306] Daniel Pearl, online chat transcript, *International Cinematographers Guild*, April 28, 2001
[307] Dante Spinotti, online chat transcript, *International Cinematographers Guild*, October 18, 2003

proposition is it? Since the late 1990s, the proper role of the digital intermediate in the practice of cinematography has usually been framed in two registers: as a new era of malleability and flexibility of moving images for create distinctive new looks not limited to traditional photography, and as a new tool that afforded more consistent and reliable management of those looks through complex workflows. These two films were winning examples of those arguments. But the question remained: would the new practices undermine the value of cinematography as classically understood? Would it pinch it between the newfound authority of special effects designers, colorists, set designers, and editors—reducing them to mere "button pushers," or would DI become one of the master's tools?

In Hollywood, of course, issues of ownership have never included looks, styles, or craft techniques, but in an era when studio franchises take on highly elaborated, technologically defined and codified "looks," and "signature styles" that are as much a part of their transmedia life as characters and narrative arcs, craftspeople might be forgiven for wondering if they, too, might benefit from their larger stake in the creative process. Curtis Clark described the "double-edge sword" of DI as leading to conflicts over ownership and digital rights:

> …because the filmmakers design the look, but the studio owns the film. Down the road do they say, "We want to be able to change that look. We would go and completely reengineer this to something else and we would repurpose the material." So you are opening up digital rights management issues, authoring issues.[308]

New production technologies often start off inspiring hostility and resistance while also presenting new creative, artistic possibilities; the possibilities are rarely realized, though, unless the new tool is in the hand of a "master" who is able to interpret the affordances of the new tool through the lens of traditional style *and* has the authority

[308] Curtis Clark, interview by the author, July 25, 2005, transcript.

to withstand the pressure toward convention inherent in the system. The flexibility of the DI clearly troubled many cinematographers since it seems to come at the cost of less guaranteed control in their craft area—as seen in the representation of John Lindley on *Pleasantville*—and as a new front on which a master cinematographer like Roger Deakins would have to make a stand. It was a threat recognized immediately by accomplished cinematographers like John Toll and Michael Chapman and many others, who loudly criticized the new post techniques before and after the emergence of these two films:

> I think the biggest immediate issue is how digital manipulation of images affects individual artists in terms of being able to maintain the integrity of their work. It seems like filmmakers have always had to fight for their work to keep it from being changed by someone for one reason or another.[309]

The professional hazard for a cinematographer is the person who refuses to collaborate. That is, those that refuse to make space for an authority exercised specifically from the craft knowledge of cinematography:

> You will always have evil, maniacal directors and colorists and editors and producers. Jim Cameron didn't allow Russell Carpenter to come into the color correction of *Titanic*…Jim Cameron's ego was such that he wanted to do that himself. Can you stop that from happening? No.[310]

Primes suggests that the best possible solution for cinematographers is to extend their craft practice and extend their professionalism:

> The only defense is to get so good at it, to learn to be such an efficient color corrector that you are fast, efficient, good, inventive, and they will look at your work and say, well, this is terrific. And it's not costing me a mountain of money, great, let the cinematographer do it. You earn your power through hard work, through knowledge, through scholarship, through doing it.[311]

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[309] John Toll, online chat transcript, *International Cinematographers Guild*, 2000
[310] Robert Primes, interview by the author, August 23, 2005, transcript.
[311] Ibid.

Primes illustrates here the self-sufficient, privatized ethos that, for many, is synonymous with freelance work in general and craft work in particular. He admonishes cinematographers that the proper response to the DI is to become smarter, cheaper, faster, and more creative, to "earn your power." In many ways this is the public face of craft's relationship to any challenge—technological or otherwise: an individualistic credo, focused on becoming a better operator within a supposed free market of skill and talent. What this chapter reveals, though, is the institutional and contested aspect of craft authority. In the complex process of producing film and television there are a finite number of opportunities to make decisions that "stick" in a project. For craft workers, creative input is a contest for the domains—places, relationships, tools, and moments—where their contributions can become "baked in." It is a territorial practice. One of the roles of craft knowledge in its many manifestations is learning to defend such territory. As David Mullen said:

> Obviously cinematographers feel that by virtue of having photographed the image and being experts on photography of the movie they should be the one to control the look in post-production. It makes logical sense. The question is, how do you guarantee that kind of control rather than relying on the good graces of the producer or studio?[312]

This question gets to the heart of the matter for cinematographers. I've suggested here that performances of craft authority are wielded on the set and through representations in trade and popular texts—through interviews and trade stories, demonstrations and "behind the scenes" footage—as one means of defense for craft prerogatives and creating, discursively, what work-practices and aesthetic-practices "belong" to particular craft areas. But such efforts are never definitive.

The trade stories of *Pleasantville* and *O Brother Where Art Thou* reveal the construction of craft authority as a rhetorical and institutional response to this

[312] M. David Mullen, interview by the author, August 15, 2004, transcript.

environment. They also point media industry studies beyond the board room, union hall and craft-table conflicts of film industry workers, complicating our historiographic tendency to limit creative contributions to the usual voices: directors, producers, studios, rights holders, and other "above the line" figures. It raises questions about the changing nature of producorial and directorial authority in the digital era—does it concentrate the power of conception into fewer hands and efface the role of craft workers, or does it diffuse the power of the director as well, as creative authority spreads into even more specialized realms? To some extent, an alternative history of the media industries could be constructed from craft texts, histories built from films that were not celebrated as works of the Auteur, but rather works forgotten by audiences, historians, and critics but celebrated and transformed into legend by particular craft areas through trade discourse and debate, industry lore, and the trade stories that linger in their wake. What the films in this case study show are craft workers—both within a single craft culture and between craft cultures—struggling over the meaning, purpose, and benefits of authorship. Like the "creatives" on the film set, craft labors in the gray zones of authorship, authority, prestige, and other claims to artfulness.

The DI was not the only wave of digital change that cinematographers were facing. By the time *Pleasantville* was released, producer George Lucas was working with Sony to build digital movie cameras of sufficient resolution for his *Star Wars* prequels.[313] Lo-fi experiments such as the *Blair Witch Project*, the Dogme 95 films, and Mike Figgis's *Timecode* were getting critical attention and industry notice. Even as they were celebrating Deakins' triumph with *O Brother* and the DI, cinematographers would be debating the problem of integrating "digital acquisition" into their practice.

[313] The resulting camera was used for *The Phantom Menace* (2002).

Chapter 6: Cinematographers and Digital Acquisition

One of the ironies of cinematography's "digital revolution" is that it was spurred and given shape in large part by a non-digital, or analog, technology. In the late 1990s, video camera footage appeared in a handful of successful independent and foreign feature films, notably *The Cruise* (1998), *Festen: Dogme #1* (1998), and *The Blair Witch Project* (1999). A few critically lauded films, such as *Leaving Las Vegas* (1995) and *Pi* (1998), were made with 16mm, the smaller gauge film format typically used for documentary or industrial applications. After 1997, producer George Lucas began working with the Sony Corporation to develop high-definition (HD) video cameras to use for the *Star Wars* prequels, then in pre-production. These movies created an environment in which "shooting without film," or, at least, without the tried and true professional film format of 35mm, became a viable alternative production method.[314] The hybrid analog-video cinema in the late 1990s and debates about the "death of film" between 1998 and 2003 inspired intense discussion and significant resistance in the cinematographer craft community. This response shaped the development of digital movie cameras in the years that followed, but also led to adaptations within cinematography as a craft culture, as early adopters and key films demonstrated a new range of cinematic styles. Much of the befuddlement and perceived hostility among cinematographers to "digital cinema" in this period was the product of a confused situation: they were asked to choose sides in a

[314] The "pro-sumer" portmanteau combines "professional" and "consumer." A term from the marketing of video cameras, it was necessitated by the generation of video cameras that emerged in the 1990s that could record video at or near broadcast-quality standards (in technical terms). The cameras typically had consumer styling and automated features with slightly more advanced lenses over consumer video cameras. In the hands of an experienced videographer they could produce professional video, in the hands of amateur it was much less likely for the video to be of professional quality.

digital revolution that was not quite a revolution and was, for that moment anyway, not even digital.

The idea of the "production camera," specifically as a *film* camera, has functioned as an important node in the construction of cinematography as a coherent body of authoritative practices and statements.[315] Built into the production camera was the esoteric knowledge of how to expose and design shots for a temperamental photochemical medium. In its attachments, in its shape and silhouette, in the workers needed to operate it to its full potential, and in its capacity for creative solutions and invention, it was of a piece with both cinematography as a craft practice and the conventions of the dominant Hollywood style. The fit of the technological system to the craft practices could be seen in the construction of focus gears and grips suited for precise selective focus, tripod heads built for smooth pans and tilts, or viewfinders that showed an actual view through the lens (as opposed to a video representation of it). The video camera had for decades been a poor cousin to the cinema as a craft, an industry, and an artistic pursuit, and the production camera testified to the necessity of a particular structure of authority called cinematography. The production camera showed, signified, and performed that need—not because a production camera was necessary to capture images in any natural sense, but because the very definition of cinema had become indistinguishable from a particular form of camera.[316]

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[315] Several of my informants, including Curtis Clark, Robert Primes, Bill Bennett, and Mike Figgis, distinguished between "production cameras" (alternatively calling them "professional cameras") and consumer/pro-sumer cameras. Descriptions of pro-sumer or prototype cameras as production cameras were especially vexing to cinematographers. Primes described Dalsa's demonstrations of their prototype data camera in 2004 as "obnoxious" and "arrogant." This contrasted with his characterization of the Arriflex Company that was rolling out a prototype around the same time: "The D20 looked pretty good, but it had some artifacts and some lines in it. But this is not a production camera and they are not putting out in the field. They are still working on it." Robert Primes, interview with the author, August 23, 2005.

[316] Latour, Bruno. *We Have Never Been Modern*. Cambridge: Harvard University Press, 1993. p 22.

Other agents, other technologies, and other systems might as easily serve to maintain such authority, but the point that Latour has made is that regimes of authority and influence—or paradigms—are defensive and nimble in their adaptation to change in hybrid networks of people, objects, discourse, and power.[317] If we think of cinematography as such a regime, then, the "problem" of video- or digitally-originating cinema for cinematographers was not one simply of managing an industry's transition to a new infrastructure, nor of protecting the sacred traditions of film as the seventh art, but rather of figuring out how to move, somehow, the deep-rooted historical and generational craft authority of cinematography—transferring it from the established systems and discourses of film to a heretofore unworthy medium and system that was "not film." In the mid- to late 1990s that medium was video and HD; after 2003 it would be digital cinema. To some extent the phrase "digital" served as an important translation device for cinematographers—as much as they resisted and resented the disingenuous use of the term in the late 1990s, by 2002 it helped elide and mask the stain of "video" from the new form of cinematography.

This prospective redefinition of cinematography's central technological system plunged the craft into a period of significant ambiguity about what constituted "professional" cinematography. It would require new structures of credibility in assessing quality and new definitions of the professional toolset of cinematography that I would collect under three general categories. Adaptations included a broader notion of what imaging *devices* were acceptable as production tools and the addition of several new roles in the specialized division of labor on set and in the laboratory. More importantly, they necessitated the decline of "*film-look*" as the bedrock principle of judging quality, replaced by a more general conception of "*look*" that included video-, digital- and

[317] Ibid.

computer-generated imagery. Finally, cinematographers more explicitly adopted the concept of "*look management*" as a professional obligation as well as a range of new technologies to that end. Look management was a concept closely related to their historical mandate as "guardians of the image," although, I argue, one that is in tension with the more artistic image nurtured by this craft culture. Look management suggests a more bureaucratic idea of craft, focused on defining and protecting workflows in new, more fluid modes of production, and bound into a wider system of socio-technical collaborative relationships that contribute to the formal aspects of a film. In other words, the cinematographer as technician began to eclipse the cinematographer as artist. With the creation of the ASC's Technology Committee in late 2002 and 2003, this technocratic transformation advanced further and cinematographers became fully engaged in the creation of future generations of digital movie cameras and monitoring the construction of coming generations of their craft tools. But, I will suggest, at some cost to cinematography's historical investment in the "master cinematographer," a kind of shadow auteur in cinematic history.

NEGOTIATING A "DIGITAL" CINEMA ON VIDEO

In the period covered by this chapter—roughly 1998 to 2003—there was no clear sense of what a digital movie camera would be, or if the term even made sense. George Lucas and other independent filmmakers such as Robert Rodriguez were shooting movies such as the *Star Wars* prequels (ph. David Tattersall) and *Spy Kids 2* (2002, ph. Rodriguez) with essentially advanced and adapted news-gathering cameras from the Sony Corporation. Meanwhile, a few low-budget films utilizing the cameras were produced by noted filmmakers, such as Spike Lee's *Bamboozled* (2000, ph. Ellen Kuras), the Polish Brothers' *Jackpot* (2001, ph. M. David Mullen), and *The Anniversary Party* (2001), shot

by a respected cinematographer, John Bailey.[318] Independent experimentalists like Rebecca Miller (*Personal Velocity*, 2002, ph. Ellen Kuras), Stephen Soderbergh (*Full Frontal*, 2002, ph. Soderbergh), Richard Linklater (*Tape*, 2001, ph. Maryse Alberti), and Mike Figgis (*Timecode*, 2000 and *Hotel*, 2001, ph. Figgis, Patrick Stewart, and others) were shooting movies with "pro-sumer" and consumer-grade cameras.

However, the vast majority of Hollywood production continued to be shot with traditional production cameras on 35mm film.[319] Even at the time of my interviews and observations with cinematographers (2004-2005) and to the time of this writing, film is still the preferred medium for most filmmakers and it is not entirely clear what manufacturers or service providers will emerge as the dominant providers of digital movie cameras to the industry, although it is clear that key manufacturers such as ARRI and Panavision have maintained strong positions in that ecosystem so far. Despite the ambiguity that continues to plague the subject, I argue that after 2003 the expectations and future meanings of the digital movie camera had to a large degree been settled; the responses and interventions of cinematographers put them in a position to influence the development track of the digital movie camera. Film was preserved, at least temporarily, as a preferred medium for most production and, more crucially, the medium of digital was developed in a way that preserved much of the craft authority and prerogatives of cinematographers. Although the craft culture of cinematography joined the institutional battle over digital cinema at a rather late date, it had the textual, discursive, aesthetic, and material means to protect the technological system that was central to its authority.

This chapter briefly describes the development of HD, digital video and digital cameras in the 1980s and 1990s, leading to the "film is dead" debate that gripped the

[318] "Sony, Panavision in Step with Visionaries." *Variety* (Special Section) February 18, 2000; "Zipern, Andrew. "Compressed Data: *Star Wars* Charts New Course in Digital Video" *New York Times*. May 13, 2002.

[319]Kirsner, Scott. "Studios Shift to Digital Movies not without Resistance." *New York Times*. July 24, 2006

cinematographer community between 1999 and 2001. Understanding cinematographers' resistance to the claims of the digital enthusiasts requires an understanding of what the movie camera means to a cinematographer, and thus the bulk of this chapter is given to a reading of the movie camera as an assemblage of technologies and craft practices through the words and observations of working cinematographers. Some of my observations may tread into arcane technical talk and I will have to simplify and gloss over many important technical distinctions, but what I hope to capture is how craft practices embodied the heterogeneous relations of these key tools, systems, and work roles and how the coming of digital changed—or did not change—them. For cinematographers, I argue, the three dimensions of *device*, *film-look*, and *look management* become the grounds on which a technological system served as a source of authority in the struggle over technological change and helped shepherd in a new system with a very similar structure of authority. Against initial resistance to digital cinema, early adopters of the new systems demonstrated the systems' interesting new capacities, using arguments hinged on these same concerns. In this chapter I describe what some early users were doing with the new forms of imaging and how craft institutions such as *AC* magazine and the ASC, as well as conferences such as CamerImage and the (National Association of Broadcasters) NAB, played a role in mediating this negotiation. The ASC intervened most forcefully in this process when it created its Technology Committee in 2002 and, in 2005, established a "camera assessment" series of tests and demonstrations. The ASC Technology Committee, while serving a crucial role in coordinating technological development in line with the established interests of industry, also worked to preserve the craft interests of cinematographers. In doing so, it demonstrated the persistence of craft as one of several important participants in the constant negotiation between technological change and the discourses and practices of art, industry, and labor.

DEVELOPMENT OF THE "DIGITAL" CAMERA

The hegemony of 35mm film first began to show cracks in the early 1980s, when the Japanese electronics manufacturer NHK began marketing high definition television—or "HDTV"—as an electronic replacement for 35mm imaging for television, and advances in 16mm film stock had made it possible to shoot with the smaller gauge film and transfer up to 35mm for distribution and exhibition. The 16-to-35 "blow up" became a cost-saving strategy among independent filmmakers in this era. Victor Nunez's *Gal Young 'Un* (1979), Gus Van Sant's *Mala Noche* (1985) and portions of Spike Lee's *She's Gotta Have It* (1986) used this technique.[320] However, it was advances in the development of the charge coupled device (or CCD) as an imaging sensor in video cameras that would point toward a new "digital" rival to 35mm. The use of CCDs, especially the so-called three-chip (or three CCD) cameras that used one chip each to create separate signals for the red, green, and blue color channels, produced higher resolution images with better color rendition than previous generations of video cameras.[321]

The merger of CCDs and film technology picked up in the late 1980s. Film scanners and other devices supported the rise of non-linear (computer-based) editing, CGI and special effects production, and offered a new tool for remediation and restoration of film (see Chapter 4). In 1987, Sony established a "High Definition Center" in Culver City, California, to develop and exploit the "coming thing" of high definition television, or HDTV. When Sony purchased Columbia Pictures in 1989, the High

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[320] The Super16mm to 35mm blow-up gained popularity in the 1990s. Some examples were Nunez's *Ruby in Paradise* (1993, ph. Alex Vlacos), Figgis's *Leaving Las Vegas* (1995, ph. Figgis and Declan Quinn), and Gary Oldman's *Nil by Mouth* (1997, ph. Ron Fortunado).

[321] The CCD (and a related technology, CMOS) is an electronic image sensor, essentially a photosensitive computer chip that converts an optical representation to an electrical signal, which is then sampled and converted to a stream of digital information. Beginning in the 1980s, CCDs replaced various forms of video pickup tubes (a variety of cathode ray tube) as an image sensor in video cameras.

Definition Center was relocated to the Columbia Pictures lot and marked Sony's strategy both of expanding into the arena of professional film production technology, and also re-thinking, not just feature film production, but also television production, which made up a significant part of the production activity at Columbia.[322] By the 1990s, Sony and NHK were engaged in a battle over the next technological foundation of broadcast television as the FCC debated the transition to digital television in the United States.

HDTV, like broadcast television's legacy format, NTSC, was an analog format. In the late 1980s, Sony and videotape manufacturer Ampex had developed digital video formats for use in high-end post-production (typically commercials and television programs). But the process of capturing images, whether by studio television cameras or electronic news-gathering (ENG) video cameras in the field, remained an analog system. Then, in 1989 Sony began its first collaboration with Panavision on a digital movie camera.[323] Camera manufacturer ARRI released the ARRI 535 in 1990, an important update of its flagship film camera that included an onboard serial port, allowing camera crews to attach a laptop computer to the camera body and download information about the shots and settings. Digital was creeping in around the edges of film practice.

In 1992, Lucasfilm Productions began work on *The Young Indiana Jones Chronicles*, an action-adventure serial for network television based on the popular Indiana Jones film franchise. The cinematographer of the series was David Tattersall and the producer was Rick McCallum, two men who would be central to the later development of Lucas' *Star Wars* prequels and the production workflow on those films. *The Young Indiana Jones Chronicles* was shot on 16mm film—a medium Tattersall judged more than adequate for television imaging. The program also allowed the

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[322] David Weiner, "Sony's Digital Empire." *American Cinematographer* (May 2001), 113

[323] Ibid., also Stephen Poster, "Sony's High Definition Center" *American Cinematographer*. (August 1991), and Ian Austin, "A Galaxy Far Far Away is Becoming Digital" *New York Times*. (May 25 2000).

producers to test digital effects workflows that merged the film-originated footage with digital effects created by Lucas' Industrial Light and Magic studio.[324] In 1994, John Alonzo, ASC, the Academy Award-winning cinematographer of *Chinatown*, was profiled in *Variety* when he shot the high-profile miniseries *Then There Were Giants* for NBC, described as the first television miniseries shot on HD cameras. Alonzo downplayed the impact of the new technology to *Variety*, saying that he had lit the show as he would a film. "I had all my usual crew and gained a couple of other members, an operating engineer and a recordist," he said.[325]

In April of that year, the Artist Rights Foundation (ARF) held an international symposium in which the technological future of film became a prominent theme. The ARF was primarily concerned with protecting the contribution and rights of artists and craftspeople from rights holders that would manipulate or revise their creative contributions. They pointed out issues such as colorization and recomposing images through film-to-video transfer techniques such as pan-and-scan, but the emergence of digital distribution was on the minds of many participants. Allen Daviau, a board member of ARF, told *Variety*, "It is the misuse of technology that we are protesting and, unfortunately, anticipating. Anticipating, even dreading." He added, "We have to emphasize that photographic reality is gone."[326] By this he meant that images were increasingly susceptible to manipulation after the cinematographer's work was done, as would indeed become a major theme in the debates to come. Later that summer, a panel of ASC cinematographers convened at the annual Showbiz Expo in Los Angeles, all individuals that would be central in the discussion of digital cinema, including *AC* editor Bob Fisher, Executive Vice President of Technology for the Walt Disney Company Rob

[324] Greenberg, Robert. "The Taming of Technology." *American Cinematographer* (October 1992), p 22
[325] Solman, Gregory. "Holding Out a Light on the Future" *Variety*. (February 24, 1994)
[326] Solman, Gregory, "Digital is the future and the future is now." *Variety*. (April 27, 1994)

Hummel, and four prominent cinematographers: Steven Poster, Victor Kemper, John Bailey, and Allen Daviau. The panel discussion focused on the many roles of the cinematographer beyond creating images, such as managing a 40-50 person crew, logistics, creative collaboration with other department heads, such as art director, production designer, and the actors, and the "freelance psychology" of understanding the goals of the producers and director. That is, it was a defense of the cinematographer as a manager and department head, in addition to his artistic voice. The group also argued (futilely, as it would turn out) against the adoption of the 16:9 aspect ratio for digital television, preferring the 2:1 aspect ratio.

In 1993, Sony released its Digital Betacam line of three-chip (CCD) cameras. These cameras were a digital-video hybrid, in the sense that they captured images in a video format then recorded the video in digital form to specially made videotape. The images had the properties of video (e.g., NTSC, video color encoding), but digitally stored on tape. In 1996, Sony began marketing this camera to cinematographers, highlighting the "programmable" settings of the camera. Larry Thorpe, an engineer and executive at Sony, and one of the most vocal proponents of HD in the United States, told *AC*, "It's like putting a certain film in a film camera. It pre-programs the camera for a given look and the variations of that look are infinite." The *AC* article was skeptical, even dismissive, of Thorpe's claims. The article was titled "Electronic Cinematography, Round Three," and started by recounting the "first round" of video's threat to film in 1980s, then the "second round" of analog HDTV in the late 1980s. The author was incredulous at Sony's claims that the camera had a higher dynamic range (analogous to photographic f-stops) than film and described Thorpe as "a man who admits to 'falling on my face' in previous attempts" to compare video to film. The article concludes, "Thorpe says he will not repeat previous mistakes by claiming that video can duplicate the look of

film. Digital Betacam is a new visual medium with extraordinary creative potential that will co-exist with chemical emulsion in a new era of digital television."[327] *Television*, not feature film-making.

By then, however, Digital Betacam had caught the attention of George Lucas. Building on the experience of *Young Indiana Jones*, Lucas wanted a production format that would streamline his post-production process for the *Star Wars* prequels, which would require even more extensive integration of computer-generated special effects. In 1996, Lucas approached Sony Corporation to explore the possibility of building an HD camera of sufficient quality to record the live action in the new *Star Wars* episodes, about to begin production.[328] Lucas announced with considerable fanfare in the pages of the *New York Times* his intention to abandon film as a medium and adopt Sony's "digital" HD cameras to save money and better integrate live action with the elaborate special effects of his space opera franchise. [329]

Between 1997 and 1999, the debate over alternative shooting formats and the implications for film style centered on Digital Betacam and HDTV. Several articles proposed that 16mm film should be phased out as HDTV provided superior resolution, drawing complaints from cinematographers. *AC* specifically criticized a demonstration by Larry Thorpe and Sony at the 1997 NAB convention that claimed to show HDTV's superiority to 16mm, especially after Thorpe admitted that Sony hadn't done any image enhancement or color correction to the 16mm footage they screened. These kinds of "dishonest" demonstrations added to a climate of distrust toward Sony, especially Thorpe, and secured the impression that Sony was putting marketing considerations over

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[327] Beacham, Frank. "Electronic Cinematography, Round Three." *American Cinematographer*. (January 1996)
[328] McKernan, Brian. *Digital Cinema: The Revolution in Cinematography, Postproduction, and Distribution.* 27
[329] Ian Austin, "A Galaxy Far Far Away is Becoming Digital" *New York Times*. (May 25 2000)

those of craft or quality, especially given their repeated failure to include cinematographers in the process of developing their new imaging technologies. By contrast, Kodak was viewed favorably, and *AC* reported on several demonstrations of successful transfers of 16mm film footage to HDTV—such as Ken Burns' 1997 documentary *Lewis and Clark*—using the new generation of data-based telecine machines developed by Kodak and Philips, a Dutch electronics multinational.[330] According to cinematographers, originating on HD could not compete with 16mm, but 16mm held up well when transferred to HD.

At the same time, there were discussions of a "widening stylistic palette" in television and film. A 1996 feature in *AC* profiled the "extreme neo-realist vision" of the film *Breaking the Waves*, directed by Lars Von Trier.[331] The film was shot on 35mm film by a veteran European cinematographer, Robby Muller, but *AC* noted that the film was made "contrary to many professional cinematography standards," including entire scenes being out of focus, scenes lit on the fly with no attempt to "beautify" the composition, and a visibly grainy image, made even more grainy by transferring the entire film to video, enhancing the grain, and then transferring back to film.

To be sure, *Breaking the Waves* featured acutely experimental techniques (and was made in distant Europe), but as several features in *AC* and *Variety* noted, 1990s television cinematography had also become a "stylistic free for all" with shows like *Twin Peaks* and *NYPD Blue* breaking many conventions in the use of dark and high-contrast images, apparently purposeful continuity "errors," and mixing film stocks of different

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330 "The 16mm Debate." *American Cinematographer*. (February 10, 1998)

331 "The Idiots" *American Cinematographer*. (January 2001).Von Trier was one of the authors of the anti-Hollywood manifesto Dogme 95. The manifesto, which dated from 1995, was a list of ten rules intended to distinguish the Dogme films from the excesses of "professional" filmmaking, represented most clearly by Hollywood cinema. *Breaking the Waves* did not adhere to the Dogme "vows of chastity" although it had some of the "anti-style" qualities of Dogme. Von Trier's first Dogme film was 1998's *The Idiots*.

color temperature and graininess.[332] The perception of a nascent "digital revolution" was supported by the popular press, such as *Wired* Magazine, which in 1997 published a compilation of predictions from entertainment technologists and creators projecting, in the effusive *Wired* style, the coming of "Hollywood 2.0." Notably, there were no representatives of the crafts in the article.[333] By the late 1990s, then, cinematographers were aware that changes in their craft practice were coming on two fronts, technology and style, and both had potential to be very disruptive. The role of the crafts in that transformation was in question. The year 1999, though, would be a turning point in these debates.

THE "FILM IS DEAD" FIGHT

Between 1999 and 2001, a remarkably open dispute erupted between, on one side, Hollywood's community of professional cinematographers and, on the other, the Sony Corporation and producer George Lucas, against the backdrop of a clear shift in the means and manner of motion picture imaging. Sony, a global electronics conglomerate, had come to Hollywood in 1989, buying its way into the content side of the film and television industry with the purchase of Columbia Pictures from Coca-Cola. With strong positions in both consumer electronics and professional broadcast technology, Sony's unique hardware-software strategy found expression in the development of HDTV, a system it hoped to see overturn the legacy system of NTSC in the United States and establish an enormous new market for consumer and professional equipment in film and television production. Sony found a willing partner in Lucas, who began working with Sony after 1997 to develop high-resolution video camera to photograph the three upcoming *Star Wars* prequels.

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[332] See "TV Lensers widen stylistic palette," *Variety*, March 6, 1998, also Christopher Probst, "Illuminating Images,"*American Cinematographer* 79, no. 10 (October 1999), 72.
[333] James Daly, ed. "Hollywood 2.0" *Wired*, 5:11. (November 1997).

Lucas and cinematographer David Tattersall ultimately used Sony's HD camera for only a few shots in the first prequel (principal photography took place in 1997), but over the next few years Lucas and Sony kept up a promotional blitz about the promise of digital filmmaking, including more articles in *Variety* and at splashy exhibitions at the influential NAB conventions.[334] In 1999, the ASC, along with film manufacturer Kodak and camera manufacturer Panavision, sponsored a conference at the Academy of Television Arts and Sciences (ATAS) called "Filmmaking at the Millennium," that was in many ways a rebuke of Sony and Lucas. Veteran cinematographer Allen Daviau delivered the keynote, stating "Camera technology will continue to evolve as it has since the early days of filmmaking," but the event was marked by wide discussion of digital technology and considerable ambivalence about digital production tools in general and Sony's new cameras in particular.[335] Cinematographer Russell Carpenter said, "I really embrace the digital future, but I've also gone to meetings where there's a lot less [control] for the cinematographer."[336] Subsequently, Sony held meetings with the ASC membership that included twenty-one cinematographers and three engineers the corporation had flown over from Tokyo to discuss the needs of cinematographers.[337]

The mingling of video and feature filmmaking was emerging on other fronts, as well. An independent feature film called *Lucia*, shot with Digital Betacam and then transferred to film, screened at ShoWest in Spring of 1999.[338] *AC* described the film as "an experiment in avant-garde digital video-making" from veteran documentary

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334 Holben, Jay. "Shooting Digital." *American Cinematographer*. (September 1999), 28; Graser, Marc. "Digital Dilemma for 'Wars?" *Variety*. (June 14, 1999), 1; Stephanie Argy, "Hi Def Digital Offers Quality." *Daily Variety*. (July 30, 1999).

335 "Digital Follows the Money." *The Hollywood Reporter*. (May 10, 1999)

336 Ibid.

337 Robert Primes, interview by the author, August 23, 2005, transcript.

338 ShoWest, now called CinemaCon, is the annual convention of movie exhibitors, held each April in Las Vegas. Studios and producers showcase their films to exhibitors and the event is accompanied by a trade show and conference featuring the latest developments in movie production, distribution, and exhibition.

filmmakers, and the cinematographer of *Lucia*, Dewald Aukema, described Digital Betacam as a medium with limited applications, although he was "confident that digital cameras will soon become a major narrative moviemaking production tool." He praised the camera's ability to do extremely long takes (compared with film), which supported the filmmakers choice to show long, uninterrupted segments of an opera performance that was central to the narrative. But, Aukema said, video would not replace film, because it was "a totally new medium."[339]

Other films kept a spotlight on video-based feature filmmaking. In April 1999, *Variety* published a special section of entertainment technology and profiled a Dogme 95 film, *The Celebration* (1998), and a low-budget American documentary, *The Cruise* (1998), both shot with consumer-level digital video cameras. The *Variety* profile noted that consumer video-based features had a crucial limitation in that broadcasters would not be willing to buy them for television, thereby cutting off an important revenue stream, but also quoted Joe Cantwell, executive Vice President of New Media at the Bravo cable network, who noted that George Lucas was also turning to video: "Two creators on opposite ends of the budget spectrum have chosen to use a format for distribution that is all about creative control and not about the middle man in the old, old sense, the nickelodeon sense." In that same month, *AC* profiled *Julian Donkey Boy*, an extremely low-budget, aggressively low-tech movie produced on digital video and, much like *Lucia*, transferred to film. *Julian Donkey Boy* was even more stylistically outrageous and claimed the mantle of being an "American Dogme" movie. It did not look like an HD or a 35mm production; if anything it looked like a product of the archaic consumer film format Super-8, with sequences of abstract, almost unrecognizable washes of grainy color. It was striking that *AC* would profile a film so glaringly outside the zone of

[339] Mark Dillon. "A DigiBeta Aria." *American Cinematographer*. (April 1999), 16.

professional cinematography, but stylistic experimentation was becoming a regular feature in the trades. In the summer of 1999, *The Blair Witch Project* was released (after creating a sensation at the Sundance Film Festival in January), and became a box office phenomenon, ultimately grossing over $250 million.[340] *The Blair Witch Project* was shot with a mix of 16mm film and consumer-grade video and largely photographed by the actors in the film's "mock documentary" narrative. *AC* wrote a lengthy profile of *The Blair Witch Project* in April of 1999, calling it a "cinema verite nightmare" and focusing on cinematographer Neal Frederick's unusual role of choosing the media, establishing some aesthetic parameters and coaching the actors how to best use their cameras. Fredericks told *AC*, "I've had some experience transferring video to film, so I knew that when we eventually transferred all of the footage to a 35mm print, the aesthetic qualities of the 35mm film would take some of the edge off the video, making it a bit softer and more pleasing to the eye."[341]

These films were widely discussed, but they were not of immediate significance to most cinematographers. As one of my informants said of *The Blair Witch Project*, the movie was interesting, but "there isn't going to be a genre or an industry of *Blair Witches*."[342] Still, the films were significant for creating excitement around the potential for video-based movie-making among independent filmmakers and for sparking the imagination of producers and directors. They also demonstrated what would become a major reassessment of the significance of "film-look" as a mark of quality in the years to come. Perhaps most significantly, though, the rise of successful films produced on

[340] With an initial budget of approximately $20,000 (and an additional $500,000 or so to prepare for wide release), *The Blair Witch Project* was one of the highest grossing independent ever in terms of return on investment.
[341] Stephen Pizzello "Sundance 99: A Cooler Climate" *American Cinematographer*, 80:4 (April 1999), 97.
[342] Curtis Clark, interview by the author, July 25, 2005, transcript.

alternative formats lent credence to the narrative of inevitability that Sony and George Lucas were weaving around digital cinema.

Despite Sony's meeting with the ASC membership in 1999, the company's credibility with cinematographers was undermined further by the NAB convention that year. Sony debuted the next generation of HD cameras, including a prototype of their F900 camera with changes requested by George Lucas and engineered by film camera manufacturer Panavision. Most significant of those changes was the ability to record at 24 frames per second with a "progressive" scanned image[343] and to accept Panavision lenses.[344] Larry Thorpe reported that prototypes of the new "24P" (24 frame, progressive) cameras would be delivered to LucasFilm in Fall 1999 and that George Lucas planned to use them to shoot the next *Star Wars* prequel, *Attack of the Clones*. 24P was the future of digital movie cameras, Thorpe declared, "we will make all of our cameras multi-format [i.e, 25, 30 or 60 fps "video" formats and a 24 fps "film" format]. You'll only have to buy one camera. Having a camera that can deliver in all of the available formats as an optional choice can make life easier."

Some cinematographers were impressed with the image quality of the new 24P camera. David Mullen said, "I think everyone was a little surprised how much improvement in quality there seemed to be by jumping to 24P." At the time Mullen was a cinematographer working in independent features and was not yet a member of the ASC; he subsequently shot an independent feature, *Jackpot* (2001), using the Sony camera and was among the first professional cinematographers to do so. Generally, though, Sony's

[343] A "progressive" scanned image in one in which an entire frame of video is captured in one continuous signal. Most video cameras prior to the F900 captured "interlaced" images, an artifact of the legacy technology of NTSC that involved scanning each frame of video twice, in alternating lines, then stitching the interlaced fields back together for display. Interlacing is responsible for creating strange effects on TV monitors, such as pulsing or discoloration around small, detailed patterns or moiré patterns in areas with stripes. By avoiding these problems, progressive frames—being a continuous temporal representation—looked more like frames from film.

[344] These cameras came to called "Panavised F900s" or the "Cinealta."

gesture toward "film style" with a video camera did little to lessen the suspicion with which most cinematographers viewed the company, nor did claims that they would only have to buy "one camera." The addition of a few different frame rates and progressive scanning did not turn the F900 into a production camera. Sony was continuing to aggressively market its cameras, in the view of cinematographers, with false claims about their capacities and the production realities of capturing professional quality images.

In December of 1999, *Hollywood Reporter* featured a report from CamerImage, a European film festival that highlights cinematography and cinematographers. Each year, cinematographers from around the world descend on the festival for special screenings, award ceremonies, and numerous professional seminars, many aimed at letting young cinematographers mingle with the veterans and "master" cinematographers. Sony was a title sponsor of CamerImage that year and highlighted DVD, digital television, and the new 24P cameras. Richard Scott, director of Sony Broadcast Business Group, told the *Hollywood Reporter*, "We don't want to storm the market and take over, saying film is dead; we are saying this is an alternative to 35mm." However, another executive was quoted as saying, "the development of a new generation of digital cameras…offers filmmakers convenience and flexibility at significant cost savings to traditional celluloid." To cinematographers these were the same mixed messages and only proved that Sony was more interested in jockeying for market share than in addressing the concerns of cinematographers.

The conflicts surfaced most forcefully in 2000, as Lucas started production on the second Star Wars prequel, *Attack of the Clones*, with an attendant burst of publicity about the movie's production methods.[345] Robert Rodriguez, after a demonstration at Lucas' Skywalker Ranch, announced his plans to abandon film as a medium in brashly worded

[345] Austin, Ian. "A Galaxy Far Far Away is Becoming Digital" *New York Times*. (May 25 2000)

interviews and in respected film schools like the University of Southern California's School of Cinematic Arts, digital video was becoming the predominant production format..[346] Lucas was interviewed and his project discussed in several lengthy features in *AC* through this period.[347] In the view of cinematographers there was "a tidal wave of irresponsible journalism that was out there in the trade press, then in the consumer press," contributing to a narrative of inevitability around digital cinema.[348] In August 2000, *AC* published an "ASC Statement on Digital Cinema." The statement was based on a presentation ASC member John C. Hora had made at a seminar in May, expanded and approved by the ASC Board of Governors.[349] It opens with a definition of cinematography: "Cinematography is the art and craft of the authorship of visual images for the cinema, extending from conception and preproduction through postproduction to the ultimate presentation of these images." It also called cinematography a "creative and interpretive process which culminates in the authorship of an original work, rather than the simple recording of a physical event" and called for digital technologies that protected the resolution, color quality, and aspect ratios of photochemical film prints and the "intentions of the authors." It specifically rejected the "lower levels of performance exemplified by…HDTV broadcast for cinema presentation." These were forceful claims from a craft that not historically marshaled defenses of this sort, claims about authorship, originality, and creative intent. The means by which they could enforce such a vision was unclear, but the ASC was clearly putting some stakes in the ground.

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[346] "H'W'D's Old Spool Ties," *Variety*. (August 19, 2002), 1.
[347] See Ron Magid. "Master of his Universe" *American Cinematographer*. September 1999, 26; Ron Magrid. "Phantom Camerawork." *American Cinematographer*, September 1999, 53; Benjamin Bergery, "Digital Cinema, by George." *American Cinematographer*. September 2001, 66; Benjamin Bergery, "Framing the Future." *American Cinematographer*. September 2001, 76; Ron Magrid, "Brave New Worlds," *American Cinematographer*. September 2002,. 50; Ron Magrid Exploring a New Universe, *American Cinematographer*, September 2002, 40.
[348] Richard Crudo, interview by the author, August 26, 2005, transcript.
[349] John C. Hora, "ASC Statement of Digital Cinema," *American Cinematographer* 81:8, 135. The ASC Board of Governors is an elected body that includes the current officers of the ASC.

The debate rolled into 2001. In March, *Variety* published an interview with director Steven Soderbergh, who had recently finished the film *Traffic*. The film was shot with 35mm film, but without a professional cinematographer as Soderbergh had filled the roles of director, cinematographer, and camera operator. The rationale, Soderbergh said, was speed: "I traded in the fact that I'm not a world class cinematographer for more production momentum." However, he also suggested that he was expecting resistance to some the stylistic choices in the film if he used a professional cinematographer: "I also thought that it would be difficult talking a DP into what I had in mind, basically different looks for different locales." On *Traffic*, Soderbergh's one-man-band methods led to negotiations with the craft unions, whose contracts dictate how workers are credited in film titles. Soderbergh has joined the Cinematographers Guild in order to operate camera on *Traffic* and wanted his credit to read: "Directed and photographed by." The Directors Guild of America and the Guild agreed with this proposal, but the Writer's Guild rejected it. In the end, Soderbergh's photography was credited under a pseudonym.[350] Over at the ASC, *AC* hadn't reviewed *Traffic,* but the next year (following Soderbergh's remarkable double-Oscar nomination and win for *Traffic*) it published a lengthy profile coinciding with the release of *Ocean's Eleven* (2002).[351] Soderbergh lavished praise on his gaffer (lighting electrician) and was complimentary toward the craft: "I don't think this should be a trend…part of what I do in my spare time is study. I read *AC,* I watch very closely what other cinematographers do, and I borrow all the time." In 2002, Soderbergh produced and directed an independent feature, *Full Frontal*, again serving as his own cinematographer and using a mix of film and pro-sumer video cameras.

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[350] Roberts, Jerry. "As DP, Soderbergh hastens Prod'n Flow." *Variety*. (March 12, 2001), 9.
[351] Douglas Bankston, "Smooth Operators: Soderbergh Doubles Down as Both Director and Cinematographer." *American Cinematographer* 31, no. 1 January 2002, 36.

Lengthy debates and complaints about the future of film-based cinematography took over online communities in 2001, as well as panel discussions at festivals, and chat sessions sponsored by groups like the ASC and the Guild. Many dismissed the debates as mere marketing hype and cinematographers' crying wolf:

> I remember guys when I was an assistant cameraman, and the old timers telling me you know what you are doing now is like becoming a blacksmith when the automobile was invented. Seriously, a guy actually told that to me once. They were saying that since day one. There was a *Variety* headline in the 1950s saying film is dead. It was all in the air then.[352]

Far from Hollywood, the National Institute of Standards and Technology convened a "Digital Cinema Conference" in January of 2001 in the Washington, DC, suburbs, to coordinate the efforts of the Society of Motion Picture and Television Engineers (SMPTE) and Motion Picture Experts Group (MPEG) in establishing benchmarks and technical standards for the digital distribution of video-based content.[353] (See Chapter 8) Engineers, exhibitors, and equipment manufacturers were on hand, but no cinematographers. Later that spring, a lengthy article in *AC* warned against Sony's growing power in entertainment technology.[354]

In April 2001, *AC* published a lengthy profile of *100 Centre Street*, a short-lived courtroom drama that aired on the cable network A&E and was shot by ASC member Ron Fortunado. The article was titled "A Favorable Verdict for 24P," and although it praised the show's image quality, the tone was considerably more mixed; a cable series was hardly the top of the profession and at one point Fortunado is quoted as saying, "I was a little disappointed that the job was multiple camera television and on tape," although he came around to "liking the tape aspect of the show." The subtext was clear:

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[352] Richard Crudo, interview by the author, August 26, 2005, transcript.
[353] Margaret Quan. "National Institute of Standards and Technology looks to spur work on digital cinema standards." *EE Times*. (January 4, 2001)
[354] David Weiner, "Sony's Digital Empire." *American Cinematographer* (May 2001), 113.

the cinematographer hadn't chosen the medium and most of the article was given to describing how to adapt film production practices to accommodate video.

In summer of 2001, the release of the feature film *The Anniversary Party* marked a significant turning point in this debate. The film was shot with the Sony DSR-500, a broadcast ENG camera that recorded to a small format DV tape (unlike the more advanced 24P camera designed for George Lucas, which recorded to Sony's proprietary HDCAM format). Although the film was an independent, low-budget production that saw only a limited release in the United States, it was the first "video-based" feature film produced and directed by Hollywood insiders, two well-known actors, Alan Cumming and Jennifer Jason Leigh. Leigh stated that she had been inspired by Dogme 95 after working on the Dogme film, *The King is Alive* in 1997. *The Anniversary Party* featured well-known actors, and was distributed by Fine Line Features, a respected specialty division of New Line Cinema (part of the Time Warner entertainment conglomerate). Most significantly, the movie was photographed by John Bailey, a respected, veteran cinematographer whose work and opinions circulated widely. Having "battle tested" the video camera, Bailey wrote lengthy defenses of film as a medium in the pages of *AC*, and a more circumspect op-ed in the New York *Times*, titled "Film or Digital? Don't fight. Coexist."[355] In the *AC* profile of the film, Bailey attempted to connect his "experimental" attitude on *The Anniversary Party* to both the radical aesthetics of Dogme 95 and the best traditions of world cinema, comparing the film to Jean Renoir's *The Rules of the Game* (1939) and his own best-known accomplishment, *The Big Chill* (1983).[356] Bailey became an important mediating voice in the debate, arguing that cinematographers were willing to explore the new technologies—an approach that appealed to the technological

[355] John Bailey, "Of Film Frames and Digital Data" *American Cinematographer*, April 2001. Also, Bailey, John "Six Recent Encounters with Art" *American Cinematographer*, December 2001.
[356] Winters, Rochelle "Love on the Rocks" *American Cinematographer* 82:7 (July 2001), 56-58, 60-63.

enthusiasm of many cinematographers—while also defending the aesthetics of film and, more importantly, the artistic contribution of cinematographers.

The open conflict and debate of the "death of film" period is remarkable in an industry that, while famously riddled with conflict on the "creative" side, has, among craft workers, invested considerable energy in maintaining a collegial, collaborative face toward the general public and particularly in the dominant narrative of technological progress in the "art and science" of the movies. The specter of corporate competition and tensions between craft areas rarely rises to the surface. However, the "film is dead" controversy profoundly shaped cinematographers' beliefs and attitudes about digital cinema in the years that followed. Much of the research for this project was conducted in 2004 and 2005, but even then—five years after the most intense discussion and debate—it was clear that cinematographers' most vivid anxieties and hostilities to digital cinema were linked to this public clash over the future of filmmaking and, most particularly, to the many offenses of the Sony Corporation and filmmakers such as George Lucas and Robert Rodriguez, who had allied with the new technological paradigm. Their greatest offense, it seems, was attempting to "innovate" and market new production tools without sufficient input from cinematographers.

In 2002, Sony Pictures Entertainment launched a "practicum" program on its Culver City lot called Lab 24P. Directors, cinematographers, and technicians were invited to a six-month-long, two-day-a-week workshop series that included demonstrations and hands-on opportunities to use digital production tools. The program was sponsored by a handful of well-known cinema technology firms with positions in digital cinema, including Efilm, Laser Pacific, Panavision, Post Logic, Sony Pictures Imageworks and Technique. A Columbia Pictures administrator described the program as "an attempt to get people comfortable with digital filmmaking." One of the goals of the program was to

move digital filmmaking past the "experimental" stage, to a point where studios, directors, stars, and craft workers would adopt it into bigger budget, mainstream production.[357] Through marketing, outreach, and educational events such as this, Sony did extend a hand toward cinematographers, but as its ambitions were clearly focused beyond simply servicing the craft community, many Hollywood cinematographers continued to view the company with suspicion.

CINEMATOGRAPHERS VERSUS SONY

In the "film is dead" debate, cinematographers accused Sony of many sins, including untruthful marketing, rigging or distorting test screenings, disseminating "propaganda" about digital cinema, and engaging in shady deal-making with producers. Curtis Clark said,

> They made some startling claims, that film was dead, that we had a true digital alternative to film origination. That created massive confusion and anger; it entrenched and polarized camps, the pro-film, anti-digital or video, in fact, in many respects it hindered the growth and acceptance of digital post because of the implications of what digital image capture - with the Sony F900 - meant as a potential replacement to film. They were positioning it as an either/or, and actually claiming that it was as good as or better than film, which was a preposterous claim, in image quality terms it was utterly preposterous, as has subsequently been well-established.[358]

Other manufacturers were developing and marketing digital video cameras, of course. However, Panavision, Canon, Ikegami, and others concentrated their efforts on either the consumer/pro-sumer category or professional broadcasting. Only Sony, through its partnerships with Lucas and Panavision, and its marketing claims, really attracted the ire of cinematographers. The narrative of inevitability created by Sony's maneuvers and Lucas' pronouncements clashed directly with the craft knowledge, traditions, and authority of cinematographers. Steven Poster, ASC, told *The Hollywood Reporter*:

[357] Claude Brodesser, "Sony Puts Digits on Digital." *Variety*, August 15, 2002, 5.
[358] Curtis Clark, interview by the author, July 25, 2005, transcript.

"Digital imaging, capture, and display is the most sought after and most feared technology that almost nobody has ever seen," and in the *New York Times* feature on George Lucas that year, Poster dismissed Sony's cameras as "inadequate" for feature filmmaking.[360]

Other producers read of Lucas' plans to build an end-to-end digital production process, and increasingly inquired about the possibility of using digital on their projects, putting cinematographers in the position of actively defending film and pushing down the claims of Sony and Lucas:

> It certainly made it the more difficult. We are talking about the producers because they wanted to follow the example of Lucas and, you know, be on "the cutting edge." It is certainly annoying when something like that happens and you have to constantly address it, and then even reduce what you have.[361]

Cinematographer Bill Bennett described Sony as making a "fatal" mistake in their attempt to infiltrate the movie-making process through producers and directors (such as Lucas and Rodriguez) and exaggerating claims of the capabilities of the F900 camera:

> It wasn't true, that was the first fatal mistake. But that was slow in coming, the realization of that. They wanted to sell or push the imaging technology not to the imaging technologists, the cinematographers, but rather to the producers, which is a huge mistake because at the end of the day it's the cinematographers who use the tools to make the images. If you piss them off right from the get-go, you've failed in your marketing campaign.[362]

Bennett described attending a Sony-sponsored demonstration of their digital camera in which the shortcomings of the camera were obvious to him:

> And then very proudly they're saying: This was all shot with the SONY 900. Looked like crap! I'm serious. I mean they chose to shoot it against a white background. Now if you've got a system that tends to clip whites, then why on earth would you shoot against a white limbo background where all the edges of people's faces are like clipping into the background and all that kind of stuff? All

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[360] Ian Austin, "A Galaxy Far Far Away is Becoming Digital" *New York Times,* May 25, 2000.
[361] Michael Goi, interview by the author, July 24, 2005, transcript.
[362] Bill Bennett, interview by the author, August 22, 2005, transcript.

> that notwithstanding, it looked like crap. And I'm looking at the whole thing and going: this looks like crap. Why did everybody tell me to come see this!?[363]

To cinematographers, misrepresenting of the abilities and affordances of a production tool, especially in comparison to the established tool set of a film camera, betrayed a rank ignorance about creating movie images and, more generally, the movie-making process.

> What's the point? It's like saying I have this beautiful Cadillac and it drives like a dream and it runs like a top and you know its ten years old but it runs like a top and it never gives you a problem, it gives great gas mileage, etc., etc., and here is this Go-cart. It's a piece of shit but it's brand new. You know it breaks down every 30 yards. You know, that's the difference.[364]

Sony's behavior was described as not just a matter of over-selling but as some kind of moral lapse. Bob Primes, otherwise a supporter of shooting new formats, described Sony as having its "knuckles rapped" for its hard-sell tactics to a community in which credibility rests so heavily on personal relationships and the ability to do the job you say you can do:

> We are collegial, we share things. This part of the industry is extremely ethical. And the idea of having someone trying to sell you something and convince and exaggerate things that they—the common stuff of Madison Avenue advertising—doesn't go well in an area as dedicated and specialized as ours.[365]

Other cinematographers claimed that the cameras didn't work out for producers, either:

> What happened was when Sony made their big push back in the late 1990s and early 2000s, episodic television producers tried it. Some of them shot a season or two with the cameras and gave it one hell of a try. At the end of the day, when they were able to analyze their numbers, spreadsheets, they found that they didn't save any money and the image quality was either equivalent or inferior. They all looked at each other and went, Why are we doing this?[366]

Cinematographers, as a privileged culture built around the esoteric knowledge of film technology, were not used to being subjected to claims from marketing professionals that

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[363] Ibid.
[364] Richard Crudo, interview by the author, August 26, 2005, transcript.
[365] Robert Primes, interview by the author, August 23, 2005, transcript.
[366] Bill Bennett, interview by the author, August 22, 2005, transcript.

cut so sharply against their authority, and they took more than a little delight when those claims fell flat. One gets the idea from cinematographers' intense reactions that Sony's lapses were seen as truly deranged, perhaps even antisocial:

> I mean, what kind of mentality goes and uses a new technology an unproven, untested, inconsistent, erratic medium and then want it to do what the mature medium does? That right there should give you an idea of the mindset behind so much of this stuff. You know, just peeling off the label on the side of a Sony ENG [electronic news gathering] camera and slapping on label that says *Cine* does not make that a motion picture camera. Regardless of what Sony tells you.[367]

Cinematographers also accused Sony of marketing to producers by giving them free cameras. That was how Bill Bennett described Michael Mann's decision to use the next generation of digital data cameras for the films *Ali* (2001) and *Collateral* (2004):[368]

> It's all free press. And there is a huge incentive to do that, the same as the case with Michael Mann and *Collateral*. I mean there were more articles up and down in both the trade press and the civilian press about what, in my opinion, was an awful looking movie.[369]

They also accused Sony of selling the cost benefits of current labor agreements for shooting video—union contracts stipulate a lower day rate for cinematographers for shooting video than for shooting film.[370] In an online Q&A at the International Cinematographers Guild in 2000, George Spiro Dibie claimed that Sony's Larry Thorpe had wagered with him that Sony would never market their cameras on that basis, concluding, "Mr. Thorpe owes me $100."[371]

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[367] Richard Crudo, interview by the author, August 26, 2005, transcript.
[368] *Ali* was predominantly shot with 35m film, with a few scenes shot with the Sony F900. *Collateral* was shot primarily with the Genesis and Viper data cameras, with a few scenes shot on 35mm film (see Chapter Seven).
[369] Bill Bennett, interview by the author, August 22, 2005, transcript.
[370] Ibid.
[371] George Spiro Dibie, ICG Q&A transcript, Sep 23, 2000, ICG website.

These attempts to undermine cinematographers' established tool set were treated as a highly personal attack and they linked the quality of those tools to a notion of craft work that stood outside the compromises of the marketplace:

> Ultimately all these tools hopefully are at the service of something decent and worthwhile. I am not working so that Sony makes more money. I am not working so ABC/Touchstone makes more money. I am working to try to accomplish something worthwhile to challenge myself so I can do better and ultimately so that what goes on the air and affects 10 millions of people hopefully does some good.[372]

What I want to underscore in these examples is the rhetorical excess in defense of craft and against video: Sony's "fatal" mistakes and the attack on video—a fifty-year old medium around which entire industries had been built—as "untested and erratic." Clearly cinematographers know that they are working to make money for ABC/Touchstone and even, to some extent, for manufacturers like Sony. After all, they had an eighty-year history of working closely with Kodak to support that company's film-related businesses. To cinematographers, though, the new cameras, and especially the manner in which they were sold, represented an assault on the dignity of craft, a zone supposedly less riven by the "common" conflicts of the entertainment industry, of marketing discourse, and the budgetary concerns of producers. To be sure, cinematographers are well aware of budget constraints. But one of the claims of craft is that it rises above such limits, that craft reaches for its own internal standards first and produces the best it can when given its tools of choice.

Some cinematographers chose to concentrate on the capacities of video movie cameras, compared to film cameras:

> Film is more flexible and tolerant of mistakes, but video is more user-friendly. It seems like a contradiction, but it's sort of true. Video makes it easier to know what you're getting while you are shooting it. But it you make a mistake it falls

[372] Robert Primes, interview by the author, August 23, 2005, transcript.

> apart faster. Film takes skill to make it behave like you want, but it has more flexibility if you make a mistake in that.[373]

Responses like this, often from younger cinematographers like David Mullen, pointed toward the shift in discourse that would accelerate in the next few years; an approach interested in recuperating the potential of new formats rather than denying them. But, Mullen's response also reveals how video attacked film craft where it is strongest: it seemed to require less skill to operate and was more available for immediate evaluation and critique. If the cinematographer made a mistake on video it was harder to recover, opening him to criticism on a new flank. Add to this the general lack of experience with the medium among creative personnel and crew, and cinematographers felt that creative and craft workers alike didn't have a good grasp of the meaning of video:

> People, once they are trained in film, expect to take a digital camera and I will say hey I will use it just like film and see if it does it. No. It's different. You can't use it just like film. You have got to learn to see the way the digital camera sees, you have got to use to its strength and avoid its weaknesses, just like you do in film.[374]

As they had for decades of film-based filmmaking, decision-makers turned to cinematographers to manage that uncertainty. Other cinematographers were aware that there were much larger competitive dynamics being played out, and the cinematographers, for better or worse, would have to adapt.

> Sony is not interested in making a few high-end professional cameras, because the market nowhere near justifies the investment in technology. Pro-sumer is the word. They want to get motion picture, Hollywood-type, endorsements of this and here is an example of bending over backward, spending a lot of money and effort to create this technology at a price point that is virtually at a consumer level. And in fact it is.[375]

To most cinematographers, this was a terrible rationale for abandoning their accumulated years of craft practice built on photochemical cinematography. For others, it was a strong

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[373] M. David Mullen, interview by the author, August 15, 2004, transcript.
[374] Robert Primes, interview by the author, August 23, 2005, transcript.
[375] Curtis Clark, interview by the author, July 25, 2005, transcript.

pragmatic reason to engage in the process of developing digital movie cameras, to "get ahead" of the technology. To better understand these contradictory reactions of cinematographers to the video-based movie cameras, we have to look at the movie camera itself and what it meant as a tool and object for this craft culture in this place and time.

THE MEANING OF A MOVIE CAMERA

Cameras record images. Consumer-grade still and video cameras are designed to perform this function as simply and reliably as possible. Although many consumer cameras have an abundance of settings and customizable features, the "auto" function remains the defining feature of the consumer-oriented device. The goal is ease of use, and the central image is that of the layperson, or perhaps a weekend hobbyist, "pointing-and-shooting" their family memories and documenting everyday life. At a minimum these cameras should capture a picture that is visible—i.e., enough exposure to capture an image and with enough resolution to provide detail—and the colors should be a reasonable simulacrum of the real world.

To a cinematographer, though, a camera is a much more complex artifact, one in which the *lack* of an "auto" function may be the most defining feature. David Mullen said:

> Even back in film school, when I started shooting video, the one thing I always wanted in a video camera was a lens with a manual focus ring and manual f-stop ring. It didn't seem like too much to ask for. I didn't understand why video cameras are so automated. I've learned since then that it is actually more expensive to make a high quality zoom that is manual. But working with servo-actuated consumer lenses is really a nightmare for traditional film-style shooting.

Mike Figgis, a director who sometimes acts as his own cameraman, related a very similar relationship to the camera:

> You don't just buy a camera and turn it on and go, oh, whatever. You actually customize it very very quickly. You strip it down and spend, in my case, several days deconstructing the camera. What it will do? I always suggest to students, write your own manual. Start a little notebook and make notes about what the camera does and record settings you like. Really push the menu in ways they did not plan.[376]

For cinematographers (and some directors) the production camera embodied an entire system of meaning and practice, based in part on qualities of the medium that ran through it (film) but, perhaps more importantly, also based on the affordances of the device itself and eighty-some years of slowly accreting improvements, new capacities, and technical accessories. Those affordances are not based on making image-creation easier and more automated, but are rather linked to cinematographers' practices along the two key dimensions of their craft: film style and the specialized division of labor within the Hollywood mode of production.

The meaning of the production camera lay in these overlapping domains and its ability to regulate certain ways of getting things done; in much of what cinematographers said in their trade discourse and my interviews, we hear less a defense of film (ala the "death of film" fight) than a process of clarifying the meanings of cinematography, its devices and customs and values, in a way that allows a translation of those meanings to a new, less film-based future. These were not (for the most part) unreflective rejections of video- and digital-image making; rather, the protests and complaints come from a craft-based sensibility in which certain regimes of knowledge and practice become indistinguishable from the tools of the trade, a product of the network of relationships between the craftspeople and their objects, relationships, and those detailed specific "features" of key devices that are not immediately obvious to those outside the culture: what those tools can—and cannot—do. The network is a form of knowledge held only by

[376] Mike Figgis, interview by the author, November 29, 2004, transcript.

the practitioners and, moreover, a form of knowledge that changes, grows, and transforms in time. The longitudinal experience of craft contributes much to the feeling of historical significance and loyalty to past practitioners and the "proven" methods and solutions that undergird much of what craft workers present as authority in an industrial system like Hollywood. The tension between style and the technical is heard when cinematographers respond to the question "what motivates you?" The answer is as likely to come from the realm of design and narrative strategy—to tell a good story, to create beautiful or memorable images—as it is to be technical—to try out a new technique, to test a new camera or lens or film stock. And intermingled with these motivations is the necessity to produce value, to not waste time or money, and to fulfill the needs of the producer and production. Art. Labor. Industry.

Craft lay in balancing these motivations and the production camera sits in the nexus of that demanding set of expectations. Charles Schwarz described the difficulty of designing an acceptable digital movie camera as coming from two factors: it had to have the right *capabilities*, defined as the ability to shoot in many different environments and produce high quality images in many different lighting conditions; and it had to be *flexible*, by which he meant an ability to be placed anywhere the scene called for, with all the professional technical and human support required, and to connect to a recording device.[377] Indeed none of the video or digital cameras that emerged in the late 1990s and early 2000s met the needs and expectation of cinematographers on those grounds, which explains the almost pro forma dismissal of the cameras in house organs like *AC*. However, it isn't enough to say that cinematographers simply resisted the possibility of a new imaging technology; craft cultures rarely reject new technologies reflexively. Rather they attempt to adapt the technology to existing practices, and in the process

[377] Charles S. Swartz, interview by the author, March 27, 2005, transcript.

communicate what would be necessary to accommodate the new technology. In the case of video and digital capture, the technology struck at the very foundation of the craft's identity, but still the cinematographers engaged in prescriptive and speculative thinking about what video or digital cinematography would look like, and what tools would be necessary to claim the new technique as "real" cinematography.

New Devices, New Roles

One of the misapprehensions of cinematography exacerbated by the emergence of video- and digital-based movie-making was the sense that cinematography as a craft was centered on problems of "exposure," that is, ensuring that the scene had enough light to create an image on the film negative. In fact, exposure was not the foremost concern for most cinematographers; advances in high speed film stock had ensured that a scene with almost any light source, even candles or firelight, can be adequately exposed, given the right film stock. That sensitivity had freed cinematographers to attempt more expressive lighting choices, on issues of composition, perspective, screen space, focal distance, and a wider variety of visual language, that is, to be bolder. As Bob Primes said:

> The classic way one learns to shoot film is to be bold and to find what the motion will hold and go to the extremes of it. If you play it safe your work will not be bold, will not be exciting. If you overdo it you make a mistake and you under or over expose it or something like that. There is a fine line, very much like the way a race driver will hold an edge and if he is just on the edge of it he can't go around the corner any faster and then he is in the groove. It's risky and it's bold but that is the place you want to be.[378]

In other words, lighting for exposure or composing shots in an entirely conventional way is the mark of a novice, or amateur, not an expressive artist working at the edge of his or her ability and the capacity of his or her tools. One of the qualities cinematographers sought in their tools is what Charles Schwarz called "the grateful acceptance of

[378] Robert Primes, interview by the author, August 23, 2005, transcript.

extremes:" What happened in the deepest shadows and in the brightest highlights of an image? Did color graduate gracefully across a blue sky, a shaded wall or a sunset? [379] As Michael Goi said, when he was presented with a new camera or film stock, "I shoot with it under extreme conditions to see what it's capable of and what it's not capable of."[380] One source of resistance to video was just this sense of once more focusing on the problem of exposure, and series of related compromises such as adding time to create "cinematic" light in the new medium, poor viewfinders that hampered operator judgment and bringing monitors onto the set to check the video footage as it was shot.

These shifts in production practice disturbed the structure of labor and crew. As a department head, and in accordance with typical hiring practices in the freelance-driven marketplace of movie production, the cinematographer hires an operator, first assistant camera, gaffer (lighting electrician), and key grip. Those hires are then responsible for hiring other electricians, grips and camera assistants they need to complete their job. The minimum camera "department" for a feature production might include between nine and twelve people.[381] Although, like most freelance work, the staffing relationships are quite informal and ad hoc, in practice camera crews tend to be relatively stable, with each person in the chain seeking out familiar and experienced hands for the difficult work and long days on the set. Relationships, especially among the key positions, may last years and whenever hired for a new show, the cinematographer is expected to turn to the known quantities of his or her past collaborators. New staffing requirements disturbed those networks, and although video-based moviemaking did not dramatically shift

[379] Charles S. Swartz, interview by the author, March 27, 2005, transcript.
[380] Michael Goi, interview by the author, July 24, 2005, transcript.
[381] Hiring practices on union productions is controlled by union minimum requirements. An ordinary minimum crew detail has an operator and two camera assistants, the gaffer and two electrical assistants, and a key grip with two secondary grips, and in most cases a specialized dolly grip. In many cases the cinematographer also directs a "second unit" with a secondary cinematographer and partial crew, used for shots that do not include principal actors, or crowd shots, stunts, or the like.

responsibilities among the crew, the lower echelon of camera assistants found themselves fulfilling new functions and some cases supplanted by a new role, the "digital imaging technician," or DIT. The DIT is a specialist who arranges, calibrates, and manages the monitors and recording devices of the "video village," an informal but intensely managed space (often tented or protected from the eyes of other crew) of monitors, video processors, and the like where the producers, directors, and cinematographers could view the immediate results of shots or sequences as they were filmed.

For cinematographers, the video village represented a drastic shift in their accountability and role of "guardian of the image." First, the ability to see immediate results of a shot allowed directors and producers to intervene in how a shot looked or was lit, which often slowed down production. Second, the ability to instantly record the day's work changed the long industry practice around "dailies." On most film-based production, each day's negative was processed overnight (or in the days following), then delivered to the cinematographer. Typically these "daily" deliveries of previous work were reviewed with the director and other department heads. To many cinematographers, this moment of reviewing their work with the director, often as the first (or last) event of the work day, was a key moment of collaboration and discussion around the design of a film. By contrast, in video-based production, work could be recorded as it happened and the need for dailies disappeared (although some productions continued the practice). Other people, from studio executives to post-production personnel, could view the material and become involved in discussions over the look and quality of the photography. In some cases, they are judging photography that was not "finished," from the cinematographer's perspective. Perhaps it required further processing or manipulation to create the look she was seeking:

> In the studio days, you came and looked at dailies and that is how you saw what things looked like. And even then they wouldn't necessarily be timed dailies. Everyone would know that if the color in this daily wasn't exactly right, it was because the DP might have been going for an effect—you know, day-for-night or some other kind of effect—and it was going to be made correct in the final color grading. But now, executives may be looking at dailies of movies on their PC. They may be looking at dailies on a VHS cassette or a DVD on a TV monitor in their office that we have no idea how it is calibrated. So DPs have an added challenge today. They have to be sure that the dailies are going to look right to the people that see them, right away! So the role of these technicians and other crews becomes really important to try to figure out.[382]

Cinematographers also complained about the poor "ergonomics" of the new cameras. Given that the Sony F900 (and other cameras) derived from very popular news-gathering cameras, this was a curious claim. After all, the Sony camera was meant to be handheld or carried on the shoulder, as were many consumer and prosumer cameras. Simple portability, though, was not necessarily a valued quality for cinematographers. As David Mullen put it, "Stylistically, shooting completely only with available light, all handheld, that's nothing new. That comes out of cinema verite, French New Wave, Neo-realism." In the estimation of cinematographers, film cameras could do that already and the enthusiasm for digital cinema was just the latest face of the cyclical fad for an artless realism, which like other "new waves" was likely to recede as quickly as it arrived.

Ergonomics, for cinematographers, referred to a complex of qualities that included size, weight, freedom of movement, flexibility with a range of familiar attachments and lenses, and their relationship to the image *as it was captured*, that is, through the eyepiece of the camera. Film camera viewfinders had a high degree of fidelity to the same image that passed through the camera lens, with colors intact, projected on a ground glass eyepiece that was visible only to operator (although, since the early 1970s, many cameras had been fitted with a "video tap" that allowed directors to

[382] Charles S. Swartz, interview by the author, March 27, 2005, transcript.

record a lower resolution version of the shot seen by the operator). By contrast, video camera viewfinders were essentially tiny television monitors that most cinematographers knew they could not trust as a reliable version of what was coming through the lens. This was another reason video-based movie shoots became reliant on the larger, calibrated video monitors in "video village."

For these and other reasons, Stephen Lighthill described the Sony F900 as "extremely cumbersome" to use when it was properly rigged for film production. According to Lighthill it was "four feet long…with a zoom lens, convertor, battery…it is an absurd physical shape to deal with. The cables are everywhere, being tripped on, taking time to change."[383] Bill Bennett also lamented the elegance of the film magazine that was being been replaced by video recorders and, after 2003, hard drive arrays to which the camera had to be tethered: "The solution for Dalsa, you saw their recorder…it is the size of an apartment refrigerator. It requires a 110-volt power supply. This is big."[384] Cinematographers recognized this as a return to the days of the coming of sound, when cameras were, for several years, confined to sound proof booths to allow for recording actors' voice tracks on sounds stages:

> Digital capture still is not there. It is not there. There are a lot of problems aesthetically, cameras are heavy, cumbersome, cables, you know, poor choice of lenses. There is a hundred different elements, monitors around everywhere. I mean, you never worked in such an adverse environment.[385]

The significance of these complaints is not just the discomfort of adapting to a tool that fits differently in the hand. Craft knowledge is embodied in the sense that tools have been adapted and fit to the physical needs of the craft people, but also in a way that preserves a particular form of authority. The eyepiece, or viewfinder, through which only

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[383] Stephen Lighthill, interview by the author, August 20, 2005, transcript.
[384] Bill Bennett, interview by the author, August 22, 2005, transcript.
[385] Richard Crudo, interview by the author, August 26, 2005, transcript.

a cinematographer (or his proxy, the operator) can pass final judgment on the success or failure of a particular shot is an example of craft authority expressed in the design of the movie camera. Similarly, the portability of the camera expressed a stylistic possibility that was cut off by the new technologies—a possibility that producers and directors would expect a cinematographer to produce. Furthermore, the new cameras were not equipped to accept many attachments that cinematographers saw as central to the decisions they would be expected to make, such as specialized tripod heads, focus rings, matte boxes, and the like. In much the same way, the decline of dailies as a necessary piece of the production schedule (a product of the lag between shooting film and viewing the results) disrupted the collaborative proximity of director and cinematographer. In the ideology of craft, tools serve the craft, they do not make the craft. The actual relationship, of course, is considerably more complex, but the first generations of video-based movie cameras were simply not craft devices, in the estimation of cinematographers.

Film-Look

During the debate over video- and digital movie-making, "film-look" became an avatar for the broader debate over image quality and the future of professional image making. At the beginning, "film-look" was a term that bundled together several arguments for the defense film and film cameras but increasingly the term became accepted as one among many possible "looks," even, ironically, as engineers and technologists worked to bring the "look" of video and digital cameras closer to conventional film imaging. Early on, "film-look" referred to the ability of alternative formats to approach the resolution, contrast, and color depth of 35mm film or, through, post-processing, be made to look more like film.[386] For instance, as early as 1996 Sony had marketed features on its Digital Betacam such as "film-look emulation." To a

[386] Alan Daviau, interview by the author, March 22, 2010, transcript.

significant degree, "film-look" was about the fundamental lack in those alternative formats, the fact they were *not* film and, to cinematographers, did not produce images that looked like filmic images, lacking the "moving grain" of film, or the capacity to show detail in the highlights and shadows of an image, or a similar range of colors of film.[387] Any medium that boasted "film-look" was already protesting too much.

"Film-look" was not entirely about the medium of film, though, and this was often lost on technologists and observers of the crafts. When cinematographers spoke of "film-look" they were often talking about the capacities of the *camera* rather than the medium. After all, the variables cinematographers consider in their work include a wide range of stylistic and technical judgments, and many judgments in which style and technique are very difficult to tease apart, or may not be teased apart at all. Judging qualities like color, grain, and contrast of film are part of this judgment, but so are the use of focal distance, lens quality, viewfinders and innumerable other parts of the actual apparatus of the production camera.

One prominent example of this debate involved camera lenses. Choosing lenses is an example of a choice that is simultaneously technical and aesthetic, and poor lenses were a source of some of the biggest complaints among cinematographers about video cameras. Lenses are rated by the light they allow to pass—thus affecting exposure—as well as the angle of their field of view, an important aspect of composition and perspective. Moreover, there have been many generations of cinema lenses as the technology has developed, giving certain lenses a kind of historical connotation. At the extreme of this phenomenon are stories like one told by David Watkin to a professional seminar at the 2004 CamerImage conference, in which he described his work on *The Charge of the Light Brigade* (1968) and a search for the oldest possible camera lenses he

[387] Stephanie Argy. "Striking 'Digital Prints'" *American Cinematographer* (June 2001).

could find, finally locating lenses from around the turn of the century. These archaic lenses, he claimed, lent the movie a feeling of old photography from the Crimean War.[388]

Video camera lenses were judged inadequate for movie making because they lacked the flexibility of cinema lenses and this complex connotation of history and practice. First, because video camera lenses were mass produced they were manufactured with less precision and, often being zoom lenses, had floating elements that made them less reliable than the high-end prime lenses to which cinematographers were accustomed:

> The biggest thing about digital video is the lens. It's such a time-compressed format that we don't have enough light coming into that chip, if you got a cheap little tiny lens it's not going to look that great. It's going to look okay; it's going to look better than it did in 1995 or 1998 but I prefer a camera that has a really nice lens, where you are not rolling things on the side, or adjusting iris, or going where is that focus?[389]

Video lenses were manufactured to produce large depths of field, which was a solution to a problem faced by news cameraman and consumers: you don't want the subject of a shot to accidentally go out of focus, thus a broad depth of field to keep as much of a scene in focus as possible. Selective focus, though, is a crucial element of film style and video lenses made it hard to plan a "dramatic" depth of field. According to David Mullen, lens choice was reduced in video-based cinematography and thus the creative palette reduced as well:

> On some films, [lens choice] is a scene by scene decision. Other movies you are going for a visual arc, moving from telephotos to wide angles, light to dark, warm to cold, playing with opposites, but usually more it is a scene to scene or shot to shot. What you are trying to emphasize dramatically at that moment? Oh, the truck is barreling down, right on us, shoot it telephoto to make the truck look huge. Oh, he looks lonely in this house maybe get a wide angle and make the house loom over him. Most filmmakers mix it up. Some directors will shoot a whole movie on one or two lenses, like Polanski or Wes Anderson, where the image is predominantly wide angle, or predominantly telephoto like Kurosawa.[390]

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[388] David Watkin, production seminar, CamerImage Film Festival, 2004. (author notes)
[389] Patrick Stewart, interview by the author, July 22, 2005, transcript.
[390] M. David Mullen, interview by the author, August 15, 2004, transcript.

Video lenses did not offer that range of choice. Even after Sony recruited Panavision to adapt the F900 to accept cinema lenses, some cinematographers were not satisfied, because the lenses it used were old models. Bob Primes said, "They used a Panavision mount, which means they have to use a Primo lenses, which are great lenses, but they are a 25-, 30-year-old design. And the Zeiss Master Primes had just come out." Cinematographers did not want to find themselves limited by new technology—to find tools taken out of their toolbox. As Michael Goi said,

> I would like to think that a format is not so rigid that whatever I want to bring to a particular project in terms of looking at the styles and stuff like that, it is not going to be dictated by the equipment as much that the equipment is there to serve me.[391]

Despite these complaints, and the flat resistance to the narrative of inevitability they were reading from Sony, Lucas, and many press outlets, most cinematographers took a view to mediate the transition and find a place for the technology within the practice of cinematography, a shift that accelerated after 2001. In 2002, Stephen Poster, who had for several years been the voice of opprobrium against Lucas and Sony, said, "Just as watercolors are to oils, this is another great way for us to tell our stories with pictures."[392] This statement, which appeared in *Variety*, was a dramatic turn in the rhetoric of resistance and defiance against video. It was inspired by the emergence of key craft texts like *Attack of the Clones*, *The Anniversary Party*, *Personal Velocity*, *Ali*, *Jackpot,* a growing reservoir of trade stories and discourse about those movies (and a handful of others), and also by Sony and other manufacturers' responses to cinematographers concerns. It was also inspired by the pragmatic craft sensibility, focused more on immediate solutions than larger contexts.

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[391] Michael Goi, interview by the author, July 24, 2005, transcript.
[392] Claude Brodesser, "Sony Puts Digits on Digital" *Variety* (August 15, 2002) p 5.

For instance, this tone lies behind the call to accept new looks but not abandon the flexible and familiar tool set: "I could make film look like DV-Cam in a good color-timing suite. No problem. But I couldn't make DV-Cam look like film."[393] Flexibility was a key value, but sometimes that pragmatism could take on a tragic tone:

> We have given it such almost a sacred status, what we call cinema. Culturally it is almost sacrilege to mess with the art form. But what is the art form? It is like oil to acrylics. We are changing the canvas a bit. But that is inevitable; the technology will do that. The history of painting is the history of the changing technology of the materials used. So I don't know that we are more immune to it than anyone else but I think, it's like, do you see it as positive thing that can be transformed into an even more powerful creative expressive art form? Or do you see something that has just interminable obstacles to be able to realize the sacred traditions that we have always practiced?[394]

As we've seen, cinematographers often compare their craft to the "fine art" of painting, and the formulation that "painters were the first cinematographers" is a commonplace.[395] With the coming of digital this analogy was extended, to the emergence of new painting techniques and traditions, as when George Spiro Dibie said,

> All the new technology is nothing but tools. Using a light meter, the old one or the digital one. How does that make your job easier? I'm sorry, it does not. You still have to paint or write with light. We are storytellers. We are painters. It is not easier for Chagall or Picasso whether they use ink or oil or whatever."

Increasingly, the concept of "film-look" was shifting; it was no longer a way to damn video with faint praise, but a way to claim that *medium* did not matter. Cinematographers could get on with talking about the digital future:

> There are just so many different ways that people do this. They do with DV-CAM. People are still using that. You can legitimately argue that that is a perfectly valid way of making a film. You may even say that you aesthetically choose that look parameter. And that is what makes this whole thing kind of a

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[393] Bill Bennett, interview by the author, August 22, 2005, transcript.

[394] Curtis Clark, interview by the author, July 25, 2005, transcript.

[395] This analogy came up in my interviews so much that it was more notable when it did not. I noted it in my interviews with cinematographers Bill Bennett, Curtis Clark, David Heuring, Patrick Stewart, and the director Mike Figgis, Also ICG chat transcripts with Ellen Kuras (Jun 23, 2001) and George Spiro Dibie (Sep 23, 2000).

> wide open moving target because before everybody's aesthetic was focused on film and what film did. *Now we are not quite sure what that yardstick reference is unless we talk about a classic pure film finish.*[396]

The problem was not video, but the lack of a universal standard to separate the professional from the amateur, the crafted from the merely accidental. The trend from the 1990s had continued, with mixing of film stocks, video formats, and unconventional styles to add visual interest and support complex narratives.[397] Vittorio Storaro, who defended film in many contexts in the late 1990s, seemed to see the transition as inevitable, suggesting that cinematographers should only try to protect the past glory of film:

> Everyone today is arguing that film is dead and digital cinematography is what we should use. They should be aware that digital cinematography is reading one third of the information obtained with a normal film negative. We should preserve films using dye transfer to have a reference of what a "film-look" is about, to give the chance for digital to rise to the level of film, rather than letting the movies go down to the digital level.[398]

The important discursive shift was from talking about video as an inferior medium to talking about it as one of the possible "stocks" or looks a cinematographer might legitimately use. In 2001, *AC* published a review of *bigLove,* one of the first short films to use the Panavised Sony 24P camera. *AC* noted that the short successfully created "the psychological effect of a big camera" by using cinema lenses and quoted the cinematographer, Patricia Vanover, comparing the video-based format to film: "I think you have to think of this camera more like some of the older film stocks."[399]

Even Richard Crudo, who mocked the manufacturers for the "lies" in their marketing, acknowledged the new landscape of looks beyond "film-look:"

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[396] Curtis Clark, interview by the author, July 25, 2005, transcript.
[397] Michael Ventre. "Film stock variations used as mood enhancers." *Daily Variety*. (January 18, 2001).
[398] Rudolph, Eric. "The Guggenheim Showcases Italian Cinema" *American Cinematographer* (June 2001).
[399] Stephanie Argy. "Thinking Big in 24P" *American Cinematographer* (April 2001).

> Digital has a different look, you know, it has a different texture. Not always immediately identifiable depending on how you see it, but once you do expose it yourself it is plainly what it is. Again, it is a creative choice. For some projects it is a good choice, for others it is thoroughly inappropriate.
> Interviewer: How do you think you would judge that appropriateness now?
> Crudo: It's hard to say outside of any context.[400]

Cinematographers seemed more assured that whatever the future of motion picture imaging, their craft would persevere, built not on a foundation of "film-look," but a new reality in which a look might take many forms. Still, sometimes their responses veered from acceptance to resentment within a single phrase, as in this exchange with Curtis Clark, when I asked about independent filmmakers like Richard Linklater and Robert Rodriguez, and start-up distributors like InDigEnt, that focused on video-originated movies:

> Sure, if you decide that it's okay to use DV-CAM just go out and shoot with available light without even giving any thought to making a feature film. Sure you can do that. People do do it. The economic necessity dictates that is the way they make their movie, but they are trying to turn that or are turning that into some kind of counter-sacred virtue. It is the antidote to the "evil restrictions" that impede their ability to be part of the traditional filmmaking process. In other words, it's anti-establishment. Hollywood equals the traditional filmmaking process which is hierarchical, it's elitist, it's expensive, it's got myopic, self-serving craft/crew interests that restrict talented individuals from being able to jump rank and move into the role that they feel they are destined to do and have every right to do because they are a film school graduate.[401]

Clark's response and his sarcastic dig at "film school graduates" gives a sense of the paradoxical grievance held by many cinematographers: somehow in this debate *they* came to be portrayed as the elites, holding special knowledge that kept producers, directors, or worse, film school graduates, from the keys to the kingdom of Hollywood. At the same time, as craft workers they felt victim to the transience, uncertainty, and ever present economic dislocation of the flexible workforce conditions of the movie industry.

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[400] Richard Crudo, interview by the author, August 26, 2005, transcript.
[401] Curtis Clark, interview by the author, July 25, 2005, transcript.

Perhaps, in the end, technological change was inevitable, but cinematographers could only hope that their knowledge that would continue to hold value, even in the sunset of film-based cinema. Despite these sensitivities, Curtis Clark advised young cinematographers to learn digital tools:

> I would say that the kind of skills sets if somebody is thinking that they are going to be entering into the profession as a cinematographer within the next two years, the more they familiarize themselves with these new digital camera technologies the better off they are going to be. They need to also familiarize themselves with the digital imaging workflow and what the pitfalls are, what the potential strengths are. Being able to use certain tools to be able to fashion looks. Be able to advise productions. They do increasingly turn to cinematographers and say, what do you think we should do?[402]

He concluded that "film-look" was becoming a sub-set of a visual culture dominated by screens and displays that really had nothing to do with film and "film-look:" "The film component becomes an element within the dominant framework of computer generated imagery."[403] If cinematographers did not become, to some extent, digital cinematographers, they would become irrelevant.

Look Management

This is the problem that "look-management" proposed to solve. Look management was the name for a class of technologies—some software-based, others in the creation of technical standards or universal descriptive languages—that attempted to preserve the intention of cinematographers through the more complex workflows that might involve film, video, or digitally originated material.

> When you talk to the cinematographers, you're going to hear a lot from them about this. What is important is not just what digital cameras develop…but how what they produce out the back end fits into this overall workflow. How does the cinematographer communicate what it is that they were trying to achieve on the

[402] Ibid.
[403] Ibid.

> set with all of those people in post-production, now that the image is going to float through their hands?[404]

Kodak released its first "look-management" system in 2003. The software promised to "maintain 'color accuracy' in the digital age" by linking digital images taken on the film set, uploaded through a calibrated laptop, and sent to post-production personnel in Kodak's post facilities. A *Hollywood Reporter* review stated that the Kodak system "allowed cinematographers to maintain image fidelity from pre-production to production, post-production, theatrical exhibition, and digital masters for aftermarket release."[405] Similar systems from ARRI and Adobe Systems soon emerged.

The concept of "look-management" exists in some tension with cinematography's concept of itself as a creative, artistic process. Cinematographers were concerned about a single system of "look-management" becoming too powerful, and equally concerned about dozens of manufacturers and post-production facilities adopting their own proprietary system, either of which would complicate the possibility of cinematographer managing the look of a project.[406] A cinematographer wants to, in the words of Ellen Kuras, "start with the initial idea of the shot or the mood of the scene. How I get there is secondary." Kuras said she is always looking for an unexpected approach, or an "alternative way of seeing the world."[407] By her measure, the most important quality of the camera was flexibility and secondarily an ability to reliably reproduce an effect once it has been found. According to Stephen Lighthill, when digital cameras reached the same level of "transparency" as film cameras—that is, when they had similar capacities and ergonomics and flexibility, they would become "usable" tools for cinematographers:

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[404] Charles S. Swartz, interview by the author, March 27, 2005, transcript.
[405] Crabtree, Sheigh. "Kodak Software to Aid DPs with Color, Images." *The Hollywood Reporter*. (September 19, 2003)
[406] Curtis Clark, interview by the author, July 25, 2005, transcript.
[407] Ellen Kuras. Chat transcript. International Cinematographers Guild. (June 23, 2001)

> The technology has to be transparent. Pick up the camera, put it on your shoulder, turn it on, it should, I don't have to tether to anybody, it's not physically imposing, it doesn't have to be far away from the actors, 35mm-like, all those issues are getting addressed and that's what is really going to make the technology usable.[408]

Here, transparency is a kind of synonym for craft, but one that focuses on the individual cinematographer's knowledge and physical relationship with the camera. It is a one-to-one relationship. In the familiar, known byways of craft practice, craft devices and ergonomics are "transparent." The ways of video and digital movie making are opaque, in part because they are more collective, more technologically bound into other crafts and technical specialties, more networked, and therefore less controllable.

This focus on managing, massaging, and holding onto their historical endowment of authority through "look-management" speaks to the persistence of craft as an institution that buffers the art and industry of motion pictures from radical change. The director Mike Figgis, a proponent of experimental and alternative formats, portrayed cinematographers as creating the future of digital cinema, but entirely in line with the past and present of Hollywood-style production. He described cinematographers as "techno-trainspotters" and belittled the craft as a "branch of the glamour industry" beholden to making starlets look beautiful and perpetually in fear of being fired for events beyond their control:

> So, they are digging their heels in and, I think, the philosophy of the industry, and that could be represented by all kinds of people—cinematographers, technicians, labs, and so on—is on the one hand, a reluctant acceptance of digital technology because the economics will ultimately force the issue, so therefore they are looking for a substitute, or a parallel to film, which would be high-definition video. But it will be exactly the same aesthetics and production standards of excellence that were present in 35mm.[409]

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[408] Stephen Lighthill, interview by the author, August 20, 2005, transcript.
[409] Mike Figgis, interview by the author, November 29, 2004, transcript.

In other words, the future might be video or digital, but cinematographers (and other technicians) would make sure that the structure of authority and stylistic values of the industry would remain unchanged. In Figgis' view, cinematographers had a death grip on the aesthetic future of cinema; whatever digital cinema became—and he didn't have high hopes—it would be their doing.

Cinematographers might take issue with Figgis' characterization of their craft commitments as slavish to producers and the studios,[410] but when the ASC finally responded to the "threat" of digital cinema, it did so by creating a technology committee that attacked the problem with a remarkably comprehensive approach. ASC President Stephen Poster asked Curtis Clark, an ASC member, commercial cinematographer and specialist on the Hollywood's infrastructure and production technologies, to draft a mission statement and lead the effort. In November 2002, Clark released the committee's mission, which stated that it would seek to intervene in the development of any technology that impacted cinematography, because "without that knowledge we will be become increasingly vulnerable to certain industry trends that could marginalize our creative contributions that have been the cornerstone of filmmaking since its inception." Clark created five sub-committees, staffed with volunteer cinematographers, engineers, and technology executives from other sectors of the industry:

HD Digital Motion Picture Cameras

Digital Intermediates

Digital Preservation

Digital Cinema (projection)

Advanced Imaging

[410] In fact they did. I saw Figgis engaged in several hallway arguments at the 2004 CamerImage Film Festival, where I interviewed him.

The new cinematography would take on questions that it had not faced before: authorship and ownership of images and looks, seeking way to mark its work in ways that would travel through the new digital workflows and protect the identity and work of professional cinematographers using regimes of metadata and indelible watermarks in the computer encoded images.[411] Looking into the future from 2005, Curtis Clark said:

> The scope of what digital is going to change…the ergonomics of the equipment, the functionality, the kinds of control that the cinematographer have on the set, the issues of metadata which is a huge part of this whole process. Do we have ways of integrating our look into file formats that can accompany that data, not as a baked-in look, but as a metadata format that determines the way you are able to render that look and render that data as a look, until somebody goes in and changes it? Now do you have ways of the establishing authorship of that, do you have ways of locking that in, so no one can tamper with it unless they have the right authority to do that?[412]

This was an ambitious vision of the new cinematography; it saw digital tools as an opportunity, not an attack on its craft traditions, but a new mandate to protect the "intent" of the cinematographer. In the past, the arcane knowledge of the film medium and production camera, along with the relative intransigence of the film negative, had made such authority an unchallenged assumption of cinematographer culture. Now it would have to be explicit and encoded, a matter of policy and technological standards. Otherwise, other fingers could intervene in the look they created:

> And that's an enormous threat to the integrity of what we do because you will have an interloper with no true interest or understanding of what the original intent was and they can come in and a producer or a director, studio executive, a craft service person. Anyone can come in and say, hey, you know what I think it will look better purple, and they turn the knob and there it is.[413]

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411 Debra Kaufman. "Metadata's Impact on Artistic Intent." *American Cinematographer*. (December 2003), 88.
412 Curtis Clark, interview by the author, July 25, 2005, transcript.
413 Richard Crudo, interview by the author, August 26, 2005, transcript.

"Digital" cinematography was unlike "electronic" or "video" cinematography in that it offered a route to protect the creative intent of cinematographers and thus, preserve the authority they had previously enjoyed in the regime of film-based photography.

FROM VIDEO TO DIGITAL DATA CAMERAS

In 2003 and 2004, a new generation of "digital data movie cameras" emerged that was entirely digital, recording optical information from the CCD or CMOS chips directly to computer hard drives with no transformation through video compression algorithms or reduction in color space to fit the signal onto videotape. This so-called "raw" format visual data was even more malleable than digital video, transportable on disks, with a new generation of chips whose resolutions approaching that of modern film stocks. In 2003, Thomson, a broadcast equipment manufacturer, released the first of the data cameras, the Viper Filmstream.[414] In 2004, Lockheed Martin, the aerospace corporation, and DALSA, a Canadian satellite manufacturing company, released two more data cameras, each built around extremely high resolution chips used in satellite imaging. Panavision and Sony also released their next generation HD camera, the Genesis, which recorded images to videotape but with improved color rendition and less signal compression.

In March of 2003, *Variety* ran a feature on the new ASC Technology Committee, describing it as an attempt to "resist market forces" by assembling "fifty cinematographers and showbiz tech leaders" dedicated to protecting the fidelity of images for filmmakers in the new digital era.[415] In the same year, the ARRI Group, a leading manufacturer of film cameras and investor in research and development into digital movie cameras, released a report stating that it foresaw "no unconditional

[414] Sheigh Crabtree. "Taking a Step Past HD Videotape." *The Hollywood Reporter*. (April 12, 2002)
[415] Dave Mcnary. "New Focus on Digital: Cinematographers Bow Standards Imitative." *Variety* (March 28, 2003).

replacement for 35mm in the foreseeable future" and that its own prototype digital camera, the D20, was suitable only for television production.

That same month, *Hollywood Reporter* wrote, "the debate appears to have come full circle" for digital cinema, as all of the major manufacturers—Panavision, Thomas, Panasonic, Clairmont, Sony—gathered at the ASC Clubhouse in Hollywood, giving the membership sneak peeks of their equipment in advance of that year's NAB conference. Bill Bennett was there, having tested the Viper Filmstream against three film stocks, and he reported his judgment: "the test proves film and digital can coexist beautifully."[416] In the next month, though, *Variety* would report, "Digital's day is not here [yet], lensers tell NAB." Digital cinema panels dominated the conference, but David Stump, chair of the ASC Technology Committee's camera subcommittee, said, "We need to remember we have all these tools in our toolbox, and if we throw away all the film cameras, we would lose so many of our tools. We should be putting new tools into our toolbox instead of taking them out."[417]

In general, though, cinematographers met the rush to market of yet another generation of digital movie cameras with less angst than they had in the "film is dead" years of 1999-2001. Because of the high resolution and "raw" recording formats, these new cameras promised image quality that was much more likely to supplant film as a medium. But the question for cinematographers had already shifted from image quality and "film-look" to whether the camera was actually a production tool. By 2005, Michael Goi was blasé about the image quality of the new cameras, stating, "The quality of the image are things that any good manufacturer is already obsessed with."[418] The new

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[416] "Digital Camera Makers Zoom in on Key Issues." *The Hollywood Reporter*. (March 26, 2003)
[417] David Bloom. "Digital's Day Not Here, Lensers Tell NAB." *Variety*. (April 7, 2003), 4.
[418] Michael Goi, interview by the author, July 24, 2005, transcript.

concern was for manufacturers' relationship with the ASC. Had they learned the lessons of Sony?

> I am looking for receptivity on the part of the manufacturer for what our particular needs are as cinematographers, primarily. Secondarily, I am looking at what their thought process was in the design of that particular piece of equipment. Like, what are their motives, as opposed to what it is that *we* need. And thirdly, I am looking at whether or not this particular format has any kind of longevity or modularity for advancement and improvement in the future or is it locked into a certain type of mode where you can't really shift. Otherwise the whole framework falls apart.[419]

This was a very different way of thinking about the craft's medium, its tools, and its relationship to the manufacturers that wanted to work with cinematographers. This new attitude was the product of the debates of the last five years, the experience of seeing video-originated movies in the marketplace, and a more active stance created by the ASC Technology Committee and its intervention in this development process (more about this in Chapter 8).

CONCLUSION

Discussions would continue inside the craft about the design of new cameras as production cameras, their ergonomics, optimal chip size, and the need for better lenses. The first generation of hard drives that accompanied the data cameras turned out to be unreliable and solid state recording became the norm. Debates would linger about whether and when film would become obsolete as an imaging medium. However, the important shift for cinematography as a craft culture was past. When "shooting without film" emerged as a niche development in the 1990s, cinematographers paid little attention; they had heard these threats before. This time, however, the specter of the "death of film" hung on, spurred by continued stylistic innovations in film and television, Sony's incursion into entertainment technology, and George Lucas' search for a more

[419] Ibid.

efficient special effects workflow. The central technological shift was not entirely "digital"—although the conjuring power of that word would play a significant role in the selling of the new cinema. Rather, it involved at first HDTV and, by 2000, a hybrid of digital imaging chips, digital encoding of video information, and high quality videotape in the Sony F900. What was portrayed as a "digital revolution" was the opening move in a game for which cinematographers, although they joined late, held a commanding position.

For them, what had been at stake between 1997 and 2003 was not the medium but the authority of cinematography, an authority that found expression in the technologies of film and camera, made durable by decades of invented uses and "improvements" to the production camera, its attachments and refinements, a division of labor, and developments in film style and creative "looks." In meeting the emergence of HD and the earlier alternative formats, cinematographers had, from their point of view, successfully resisted Sony's marketing "misdeeds," bringing Sony and late-coming manufacturers like Dalsa and Thomson into discussions of what properly constituted a production camera and professional imaging. *American Cinematographer*, *Variety*, and other trade press provided a valuable platform for these debates, one comfortable with—if not favorable to—the traditional conceptions of craft authority that the cinematographers' represented. Finally, the ASC institutionalized those relationships when it formed the Technology Committee and engaged the questions of technological change directly. Cinematographers had maintained their authority and to a large degree the shape of their tools, but at the cost of becoming more embedded in a technological future of cinema that would change faster and with more complexity. They would be vulnerable to obsolescence, with a more uncertain grasp on their own authority; vagaries of the digital workplace that were familiar to their contemporary creative workers.

Chapter 7: Digital Acquisition and Craft Authority in Practice

If the ergonomics of the production camera and influence of new service providers was cause for concern among cinematographers, their greatest concern was reserved for the demise of "film-look" as a standard for judging masterful cinematography. As a descriptor, "film-look" is often referred to as a quantifiable attribute, based on variables such as color gamut, grain, contrast, and latitude. "Film-look" was more significant to cinematographers as a way to talk about the techniques of classical cinematography, such as selective or deep focus, the expressive use of shadow and color, and figure modeling and portraiture—techniques that have formed the foundations of cinematography since the professionalization of the craft in the 1920s. The presence of video- and digital-based cameras in production contexts created concrete challenges for the maintenance of those techniques and led to competing styles and looks, compelling cinematographers to consider whether new techniques needed to be enfolded into contemporary definitions of masterful cinematography.

Four films that emerged in the period from 2001 to 2004 demonstrate the range of responses to alternative formats among cinematographers—*The Anniversary Party* (2001), *Star Wars*: *Attack of the Clones* (2002), *Personal Velocity* (2002), and *Collateral* (2004). In this chapter I discuss *The Anniversary Party* and *Collateral* at length and *Attack of the Clones* and *Personal Velocity* in slightly less detail, but in each case I will provide the production context and a sketch of the plot. I will then describe how each movie presented "video-look" (as opposed to "film-look") and conclude with some discussion of how the craft community received the film and broader implications for cinematography. These were not the only (or the first) films to be shot using alternative formats (see Appendix 2), but these were the projects most often mentioned by my

cinematographer-informants as important for the development of their opinions about digital cinema. As with *Pleasantville* and *O Brother Where Art Thou?* in the late 1990s, the discussion around them helped establish a practice and discourse of digital cinematography. These films also present an interesting range of workflows and modes of production: *The Anniversary Party* was a project produced by Hollywood insiders using low-budget techniques; *Attack of the Clones* was a CGI-dependent, highly-profitable franchise property; *Personal Velocity* was an independent production from a critically-lauded production team; and *Collateral* was a star-driven genre film. These are divergent projects in terms of the complexity of their productions and position within the political and cultural economy of cinema. Each created discussion about the limits and boundaries of craft practice. As we will see, all are significantly informed by classical notions of masterful cinematography while also revealing the contradictions and compromises within the craft as it grappled with a disruptive technology.

Patrick Keating has argued that the centering of "invisible style" as the dominant norm of classical style ignores the extent to which expressive lighting was central to the discourse and practice of cinematography in the studio era.[420] Classicism, he argues, was less a product of adhering to norms than of the crafting of judicious compromises among many competing ideals that comprised the classical style, ideals like glamour, realism, the illusion of roundness, story, continuity, and many others. Craft conventions help craft workers negotiate those compromises.[421] Keating describes four "general groups" of conventions that guided cinematographers' understanding and use of technique: figure-lighting, genre/scene lighting, effects lighting, and composition.[422] For purposes of my discussion I would add another group of conventions to this list: color.

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[420] Keating. *Hollywood Lighting*, 72.
[421] Ibid., 192.
[422] Ibid., 3.

Figure-lighting refers to the conventions of lighting actors; modeling of the face is especially significant in this group of conventions. Genre/scene conventions refers to techniques of lighting that have come to signify particular narrative tropes, such as, for example, warm, dim and diffuse light in a romantic scene. (Note that genre/scene lighting is only partly articulated to film genre; a romantic scene may appear in a comedy, drama, horror, or thriller.) Effects lighting refers to techniques of representing "real" sources of light (or real-world qualities of light) such as firelight, dappled light from trees, lamp light, sunlight, etc. Effects lighting derives from the principle of motivation, which is a key value within cinematography's conception of realism. To a cinematographer, sources of light should, if at all possible, be revealed as coming from within the diegesis and if not revealed directly, implied and identifiable. Composition refers to the balancing of light and framing to guide the viewer's attention; this refers not only to staging and camera angle, but also uses of focus and depth-of-field (the zone of sharp focus within the frame, in front of and behind the point of critical, or perfect, focus). Finally, color refers to conventions around the use of tonal variation within a composition, but also other qualities of color such as saturation (intensity), mood, and realism.[423] Often a lighting choice ties together several principles, for example, the "flashlight effect," in which a hard, focused spot is used to create the impression of a police flashlight. As Keating has described, when this emerged in the 1920s, it required a certain amount of technique to achieve the effect, which became associated with the crime thriller and could, depending on its use, contribute a variety of moods to a scene and often affected

[423] See Keating, 3. The first four of these conventions are taken from Keating, whose work covers Hollywood lighting from roughly 1920-1950. I've added color to the list because since the 1950s conventions of color have become an important part of cinematographers' practice. With the emergence of digital cinema, concerns about color rendition, reliable definitions of tone and tint, and conventions around color became a significant point of discussion among cinematographers, illustrated in Chapters 4 and 5 with the debate over the digital intermediate.

figure modeling.[424] In the cases that follow, I will draw on these conventional notions to describe cinematographers' responses to my film cases.

It should be clear by now that I am not claiming that these films fall outside of conventional narrative strategies or other standard Hollywood production practices (e.g., specialized divisions of labor was more or less maintained in each case). In fact, if anything, these films all represent conventional treatments and production practice to varying degrees, while also attempting to accommodate the video or digital camera as a production camera. There is an important stylistic divide that arose between, on one hand, cinematography like that in *The Anniversary Party* and *Attack of the Clones* that strove to re-create "film-look" with the new video- and digital- production tools—in fact attempting to efface the "digital" origination of their films by demonstrating video- or digital-origination as indistinguishable from film origination (while, it must said, trumpeting their digital provenance in the press). On the other hand, in films like *Personal Velocity* and *Collateral* cinematographers used digital tools to fashion a look that challenged traditional "film-look," establishing novel looks unfamiliar to movie audiences and critics.

One of the interesting contradictions of these pairings is that *Attack of the Clones* and *Collateral*, which I described as stylistically very different, are both thoroughly conventional genre films. Likewise, *The Anniversary Party* and *Personal Velocity*, although strikingly different in style, share roots in the highly-personalized low-budget domestic drama of the American independent film movement. What I think will be made clear is that each of these films made certain commitments to classical style while also diverging from it. In each case, a cinematographer (or two) grapples with an emerging technological system that other institutions have positioned as a "replacement" for film.

[424] Ibid., 246.

Cinematographers resisted that claim, but through films like these began to negotiate an emerging reality about cinematic modes of production: in the future, many kinds of devices might be called "production camera." These films helped begin the process of uncoupling "film-look" from the film camera and, more generally, masterful cinematography from the film apparatus. In two of my cases here digital cinematography is seen as an impediment to the maintenance of classical style and the affordances of the camera must be warped, hidden, fixed or just ignored to maintain that claim. In the other cases, classical style is maintained in certain ways, but a commitment or claim to "film-look" as an ingredient of that style is more complicated. A different relationship to look was emerging, if not entirely welcomed, as an aspect of film style.

THE ANNIVERSARY PARTY

The Anniversary Party was written, directed by and starred two established Hollywood stars, Jennifer Jason Leigh and Alan Cumming, and was photographed by John Bailey, ASC. It was produced and distributed by Fine Line Features, a division of New Line Cinema and the Time Warner conglomerate. In the movie, a Hollywood couple, Joe and Sally, hosts a party in their elegant home for about a dozen of their close friends and colleagues. The plot covers twenty-four hours, as the couple—Sally a fading female star, and Joe a successful novelist about to direct his first film—plans the party, welcome their guests, and, as then night goes on, drink, swim, get high and then crash down from the drug Ecstasy as revelations and conflicts emerge among the partygoers. Most of the film is set inside the house and on the pool patio of an iconic house in the Hollywood Hills designed by the modernist architect Richard Neutra; the home is composed largely of glass walls (see Figure 20. A rare establishing shot from *The Anniversary Party*, showing the Neutra house's glass walls and pool patio. Note the bright but neutral cloudy sky, bringing down the overall light levels, but also lowering the

color saturation and contrast in the image overall.) and the reflective surfaces and transparency of the walls of the setting plays a large role in the style and narrative structure of the film.[425]

Figure 20. A rare establishing shot from *The Anniversary Party*, showing the Neutra house's glass walls and pool patio. Note the bright but neutral cloudy sky, bringing down the overall light levels, but also lowering the color saturation and contrast in the image overall.

Bailey is a veteran cinematographer, best known for his work in successful relationship dramas such as *Ordinary People* (1979), *The Big Chill* (1983), and *As Good as It Gets* (1997). Bailey's decision to take the job on *The Anniversary Party* and accept the directors' wish to shoot the movie with digital video cameras was a significant moment in the craft culture of cinematography, as a respected cinematographer took on the challenge of shooting a video-based feature film. The significance of the project was cemented when, between November 2000 and December 2001, Bailey wrote three articles that appeared in *AC* as well as an Op-ed in the *New York Times*, offering his thoughts on the "film is dead" debate, describing his experience shooting *The*

[425] Diane Friedman. "Currents: A House as a film Star" *New York Times*, May 31, 2001, F2:3.

Anniversary Party, and generally defending the artistic prerogatives of cinematographers and (based on his recent experience) film as a medium superior to video.[426] The movie's production also received feature coverage in *AC* the month after it was released.[427] The movie was generally well-received by critics and had a limited release in the United States, earning $5 million (on a reported $3.5 million budget). Some of the film's press noted the "digital" origination of the project and singled out Bailey's contribution, as in Todd McCarthy's review for *Variety*:

> Although the digital video imprint is still evident, ace vet lenser John Bailey has gone a long way toward making this film look like a celluloid shot picture, most successfully in the bright, daytime scenes, less so at night or under low light conditions, where the images sometimes appear washed out.[428]

Generally, though, the digital origination of the project was noted as an aside, or an afterthought, in reviews.

Given the film's overall adherence to classical style, the lack of comment about digital origination is not surprising. In his own statements about the project, Bailey sounded like many experienced cinematographers in this period: expressing curiosity about the new technology, suspicious of the motives of those with technologies to sell, and deeply committed to film as a medium and classical style as the foundation of cinematography. Unlike other ASC cinematographers, though, he accepted this relatively high profile assignment to use digital video and, by all accounts, appointed himself spokesperson for the emerging debate around digital origination for feature film. One cinematographer explained to me (not talking about Bailey) the significance of becoming perceived as an expert with new technologies:

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[426] Bailey's role as an opinion leader and in-house intellectual and historian have continued. He has appeared on numerous panels and professional forums and since September of 2009 has written the "John Bailey's Bailiwick" blog hosted by the *American Cinematographer* website.

[427] This late coverage was curious, since production coverage in AC generally coincides with the pre-release press campaign of the film.

[428] Todd McCarthy, "The Anniversary Party." *Daily Variety*. May 29, 2001, 8

> It allows them—and I'm not critical of—he is a very, very nice guy. So please don't get me wrong. But in a more general sense, it allows them to become an expert in the producer's eyes in this new technology. It gives them a certain cachet that makes them valuable. And you have to have something that makes you valuable to the producer. Does that make sense? And he has become an expert. And he is very good at it. I don't know if you know this, but he won an ASC Cinematography Award for a show that he originated with the F900 camera. So there is validation that he is very good. Don't get me wrong, that he is not good at it. He took that system and made it really work for his show.[429]

Early adopters such as Bailey contend with the perception that they are angling for competitive advantage in the ecology of craft labor, and certainly that may be the case for Bailey. However, in the course of his writings Bailey expressed the range of opinion about digital video, asking at various times whether it was just a visual novelty, a marketing scheme, or, in his words, "a genuine rebirth of cinema?"[430]

> I have to ask myself whether film itself, the medium of celluloid, has somehow become emblematic of the stylistic hubris of Hollywood…why should this century old "capture medium," a medium capable of great beauty and subtlety, be declared dead by a claque of critics and students who have never even used it?[431]

Over the last decade, Bailey has continued to call for the preservation of film-based production, or at least, as he wrote somewhat plaintively, "Don't Fight, Coexist."[432]

Bailey described himself as motivated by curiosity about the new cameras and a professional interest in the Dogme 95 movement. He said, "I wanted to see for myself, applying the technique that I would bring to a traditional movie, whether I could incorporate some of the digital video Dogme techniques, while still rendering a polished, Hollywood look."[433] There is some irony in this statement, of course, since the explicit aim of the Dogma manifesto was to jettison Hollywood polish, placing technical simplicity and amateur-seeming immediacy over professional fussiness and the

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[429] Bill Bennett, interview by the author, August 22, 2005, transcript.
[430] John Bailey. "Digital, Digital Getdown." *American Cinematographer*. November 2000, p 119.
[431] Ibid.
[432] John Bailey. "Film or Digital?: Don't Fight, Co-Exist." *New York Times*. February 18, 2001.
[433] David Heuring, "DP Short Notes." *Daily Variety*. January 15, 2002. (special section a10)

craftsperson's preoccupation with technique. However, as Bailey also noted, the Dogme films were not immune from such contradictions: the best known Dogma films, *The Celebration* (1998) and *Dancer in the Dark* (2000) were photographed by respected European cinematographers Anthony Dod Mantle and Robby Muller, respectively.

VIDEO LOOK IN *THE ANNIVERSARY PARTY*

This tension, between modeling a production on the "informality" of Dogme 95 while upholding classical style, became a key part of the discourse around *The Anniversary Party*. *AC* reported, "Although Bailey, Leigh, and Cummings agreed that tape was the appropriate medium with which to tell their story, they didn't want their film to have the same rough, home-video feel as Vinterberg's [*The Celebration*]."[434] The assertion above that "tape" was the "appropriate medium" for this movie is an interesting and commonplace move in craft discourse, a post hoc justification for the aesthetic choices of the creative team as entirely natural; in fact, demanded by the material. In the same article Bailey is quoted saying that video cinematography allowed a "spontaneous and manic quality" but also a "classical, controlled look." He called it a "hybrid approach."[435] Throughout the *AC* article, though, Bailey describes the many ways that video-based cinematography was an enormous drawback for the visual design, requiring extraordinary time and effort to create the "controlled, classical" look to which he refers.

To begin, he described the video format as the "exact opposite" of his preferred format, 35mm film and anamorphic lenses, a combination that leads to shallow depth of field, selective focus, and, of necessity, careful compositions to guide the viewer's attention. Bailey lamented many compromises made to accommodate the "limitations" of the video camera and its inability to duplicate "film-look," primarily the low resolution of

[434] Rochelle Winters, "Love on the Rocks." *American Cinematographer*. July 2000, 57.
[435] Ibid.

the camera and a smaller color gamut that led him to avoid wide shots and master shots, emphasizing medium shots and close-ups (See Figure 21 and Figure 22).[436] Compositions in these shots are classically-informed and, in the case of Figure 21, well within the conventions of domestic drama. Where they diverge is in the quality of color and lighting on the principal characters' faces.

Figure 21: A typical two-shot from *The Anniversary Party*. Even, diffuse light offers little modeling on the foreground actress's face while the natural light fill from side creates fairly harsh shadows on both actresses' faces. The colors are muted and contrast low.

Likewise, because video has a smaller dynamic range than film (i.e., it loses the ability to detect detail in dark or light extremes of the image more quickly than film), Bailey pointed out many shots in which exterior views are extremely bright or even washed out completely, as he had balanced the lighting for interior figures and faces. Figure 22 demonstrates how the bright exterior landscapes "blew out" with very high light levels in many scenes, losing detail and texture and creating abstracted, unrealistically colored backgrounds. With a smaller dynamic range, video made it

[436] Ibid.

difficult to balance shots that contained a wide range of light levels, such as this. (In *AC*, Bailey reported that he requested a large sheet of filtering material to cover the window and partially counteract this effect, but it did not arrive in time for the shoot.)

Figure 22. The charades scene in *The Anniversary Party*, played against the Neutra house's windows.

A similar problem is seen in Figure 23. In this case, highlights in Sally's hair and on her face and clothes exceed the capacity of the CCD to capture detail. Edges are sharp and attractive modeling is difficult—hallmarks of a video-look. However, unlike the overexposed exteriors above, it can be argued that some of the harsh contrasts in the Sally's facial modeling fit within the style system of the movie since her fear of aging and professional prospects as an actress drive much of the conflict in the film. A comparison with Figure 24 is instructive. In that shot a young actress arrives who will heighten Sally's insecurities. In Figure 24 the modeling on the actress' face uses a cross-key motivated from the exterior. This is not glamour lighting, but with the ample fill light and lack of harsh edges the softer, warmer light emphasizes her youth, beauty, and vigor. The effort to maintain this kind of lighting for this younger character throughout the

movie demonstrates the persistence of classical technique—using light to support narrative goals—despite the challenges presented by video-based cinematography.

Figure 23. A close-up from *The Anniversary Party* demonstrates the problem of contrast for video cinematography. Compare the modeling in this shot to that in Figure 24.

The technical affordances of the video camera, coupled with shooting in sunlight and natural light, led to much less control of depth of field, and thus, many shots in which the entire frame is in focus or nearly so. The wide composition in Figure 25 shows how video camera optics created a deep focus effect in conditions with ample ambient light. Under more controlled lighting conditions at night, the cinematographer is able to create more shallow depth of field and selective focus (See Figure 26 andFigure 27). A film-style technique of completely isolating characters with shallow focus was rare in this film. It would have been difficult given the affordances of the video camera CCD and its lens. In all of these shots, colors are lacking saturation and the "Dogme-style" lighting strategy relied on a great deal of un-directed ambient light which, although motivated by lamps and fixtures, leads in Figure 26 and Figure 27 to relatively harsh modeling with

hard shadows on both actors' faces, flat skin tone, and little separation between the main characters and the background. To some extent, though, as before, these aspects of video-look match the mood, psychology, and genre of the scene.

Figure 24. In *The Anniversary Party*, a young actress arrives whose beauty and ambition will soon cause problems for the main characters. Note the exterior beginning to overwhelm the camera's sensor, deep focus, and multiple reflective surfaces.

The qualities I describe here would be seen by cinematographers as markers of a "video" or non-film look. However, the compositions, figure lighting, and genre/scene conventions reveal a dominant sensibility grounded in classical cinematography—mood, psychological realism, lighting for effect, and so forth. Bailey's loyalty to these principles comes from his long experience, his self-appointed task to defend the craft, and the challenge he set for himself to merge "Hollywood polish" with Dogma immediacy.

Figure 25. Deep focus in video-based cinematography. A balanced wide shot composition holds the foreground, middle ground, and background close to focus. Contrast Figure 26.

Figure 26. At the end of a long night. A close-up close to the end of *The Anniversary Party* is the opposite of glamour lighting, but maintains certain important conventions: mood-for-story, the illusion of roundness, relatively shallow depth of field matching this emotional moment.

Figure 27. The toast scene in *The Anniversary Party*—like most of the plot—took place at night under more controllable lighting conditions, allowing slightly more control of depth-of-field effects.

CRAFT REACTIONS TO *THE ANNIVERSARY PARTY*

Bailey's role in this craft discourse resembles that of Roger Deakins using the DI for *O Brother*, a master of the craft trying out creative possibilities of the new gear and reporting back to his colleagues in the trenches. As the expert, Bailey puzzles through the limitations of a new tool set, evincing on one hand mastery while (in contrast to Deakins) admitting a kind of instructive failure at the same time. In his April 2001 *AC* column, Bailey gave his own work a back-handed compliment, stating, "No cinematographer or visually sophisticated director would ever mistake it for the subtle tonal gradation and latitude of film, but it doesn't quite look like video either."[437] In the July 2001 *AC* feature on the production, though, he seems much more critical: "Given the current technology, I don't think that DV is appropriate if you're trying to capture images that have fine detail,

[437] John Bailey. "Of Film Frames and Digital Data." *American Cinematographer*. April 2001, 134.

grand scale, or real subtlety in color or lighting."[438] In other words, if you want the images to look good, use film.

Six months after the release of *The Anniversary Party*, Bailey wrote a lengthy column in *AC* titled "Six Recent Encounters with Art," describing six experiences he had on the streets and in the museums of Paris, linking those experiences to the past, present, and future of cinematography—specifically the primacy of cinematography's "classic principles" of lighting, composition, movement, and coverage that would, he wrote, outlast any changes of technology.[439] Having spent time behind the digital lens, Bailey had more authority than most, then, when he concluded: "Who demands that the cinematographer can be reduced to a technician capturing pixels or extruding celluloid like so much sausage? Only a few hectoring control freaks, pencil pushers and one-man-band ego-maniacs."[440] Written at the height of the "film is dead" debate, as this was, we might surmise who Bailey was calling out in this broadside: George Lucas, anonymous studio accountants, and Robert Rodriguez, respectively.

However, Bailey's audience for these efforts was largely other cinematographers, and they noticed. David Heuring, former editor of *AC*, said,

> Everybody is curious to see when somebody on the level of Bailey does something like that. Everyone wants to talk to John: Hey, what are you doing, how was it? They don't necessarily go, how much resolution was that? It's just, how was your experience? Were you able to get the shots you wanted? Were you happy with how the images looked? Everybody talked about *The Anniversary Party*.[441]

David Mullen told me that in his preparation for shooting another early video-based feature, *Jackpot* (2001), he investigated the cameras Bailey used on *The Anniversary Party*. He repeated Bailey's description of that film (and his) as a "hybrid:"

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[438] Rochelle Winters. "Love on the Rocks." *American Cinematographer*. July 2001, 56.
[439] John Bailey, "Six Recent Encounters with Art." *American Cinematographer*. December 2001, 104.
[440] Ibid.
[441] David Heuring, interview with the author, November 30, 2004, transcript.

> All these films are on a kind of continuum. There are no hard and fast traditions. *Anniversary Party* has a DV aesthetic, yet it's shot on a low-end pro video camera and a professional DP and certain amount of lighting. Yet it is not as high-end as a total film shoot with a large light package. It was a hybrid between traditional film style and guerilla, low-budget style.[442]

In the communication of craft knowledge Bailey's role is somewhat like that of an early adopter, but this picture is complicated by the sense that he was far out on a limb—behind enemy lines, as it were—and a test subject, if one authorized by reputation and prestige to report back the promise and problems of the new technology. He was endowed with a degree of credibility that a younger cinematographer (such as David Mullen) or a mere technologist or marketer would not have and, ultimately his report was skeptical because the video camera did not reproduce "film-look" satisfactorily.

STAR WARS AND *PERSONAL VELOCITY*

This chapter focuses most of its analysis on *The Anniversary Party* and *Collateral*, the two digitally-originated movies produced within the studio system by established professional creative and craft workers. I do want to briefly discuss *Star Wars*: *Attack of the Clones* and *Personal Velocity*, two movies released in the same year (2002) and both originating on digital video cameras.[443] They are alternate examples of movies that helped establish digital production in the popular imagination and in the craft discourse of the time. I've given these films a bit less attention here because this research has generally focused on the relationship of mainstream, professional cinematography within studio-financed production to digital production tools—largely represented by members, events, and publications of the ASC. That said, these films (among a few

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[442] M. David Mullen, interview by the author, August 15, 2004, transcript.

[443] The provenance and capabilities of those cameras was vastly different, though. *Attack of the Clones* was shot with the Sony F900, a high-definition video camera converted to shoot 24 frames per second and revised to accept Panavision cinema lenses. *Personal Velocity* was shot with an off-the-shelf Sony PD-150, a prosumer-grade standard definition video camera. See Winters, "Love on the Rocks." and Benjamin Bergery. "Framing the Future." *American Cinematographer*. September 2001, 76.

others, such as *Full Frontal*, *Spy Kids 2* and *28 Days Later*, all released in 2002) could be argued to have equal to or wider influence on the public perception of digital cinema and the discourse and practice of cinematography. George Lucas and the first two *Star Wars* prequels, in particular, received enormous amounts of attention between 1997 and 2002. Lucas's advocacy for using digital production tools across the entire production process, from visualization, to visual effects, and origination to exhibition, provided an enormous platform for technology companies and advocates of digital production to showcase digital cinema. Each of these films was important to cinematographers as well and that is what I want to describe here.

VIDEO-LOOK IN *STAR WARS*

Star Wars: The Phantom Menace (1999) and *Star Wars: Attack of the Clones* (2002) may be among the most discussed movies of all time, at least with regards to the technological base of their production.[444] Not only did the films receive enormous popular press coverage, *AC* printed six lengthy features about Lucas and the *Star Wars* projects between 1999 and 2002, as well as various ripostes and responses in the form of columns and editorials.[445] As I describe in Chapter 6, Lucas had set off a wide debate over the future of cinematography in the late-1990s when he partnered with Sony Corporation to develop high-definition video cameras to shoot live action sequences for

[444] The popular and trade press promoted *Star Wars'* "digital" creation extensively in articles such as Ian Austen, "A Galaxy Far Far Away is Becoming Fully Digital." *New York Times*, May 25, 2000; Andrew Zipern. "Compressed Data; Star Wars Charts Course in Digital Video." *New York Times*, May 13, 2002; and David Bloom. "Digital set for Hyperdrive." *Daily Variety*. October 8, 2002, 9. *Star Wars'* production methods were also profiled in books, such as Brian McKernan. *Digital Cinema: The revolution in cinematography, post-production, and distribution*. (New York: McGraw-Hill, 2005); Kirsner. *Inventing the Movies*; Rubin, *Droidmaker*, and a book George Lucas contributed to directly, Alex Ben Block and Lucy Wilson. *George Lucas's Blockbusting*. (New York: It Books, 2010).

[445] See Ron Magid. "Master of his Universe" *American Cinematographer*. September 1999, 26; Ron Magrid. "Phantom Camerawork." *American Cinematographer*, September 1999, 53; Benjamin Bergery, "Digital Cinema, by George." *American Cinematographer*. September 2001, 66; Benjamin Bergery, "Framing the Future." *American Cinematographer*. September 2001, 76; Ron Magrid, "Brave New Worlds," *American Cinematographer*. September 2002, 50; Ron Magrid, "Exploring a New Universe," *American Cinematographer*, September 2002, 40.

the *Star Wars* films, in order to facilitate easier integration with the computer-generated special effects that make up most of the movie's settings and secondary characters,. Whatever might be said of Lucas' desire to avoid the legacy apparatus of studio production (as one informant told me, "DPs feel like Lucas has a goal to get rid of all these pesky filmmakers he has to work with"[446]), he has shown a zeal for communicating with craft communities through their trade press and professional organizations, evangelizing for adopting digital production tools.

Sony's progressive-scan high-definition movie cameras were still in prototype at the time *The Phantom Menace* started shooting, so an adapted high definition video camera was used to shoot a few crowd shots as a test. Lucas told *AC* in 2002 that he never wavered from his plan to shoot *Attack of the Clones* with digital video, "We knew that right from the beginning, because we shot parts of *Phantom Menace* digitally and nobody could tell which shots were digital and which weren't."[447] Cinematographers did claim to tell the difference, as David Mullen told me, "Well, he felt that he proved that High-Def was acceptable quality in *The Phantom Menace*, but that footage definitely did not look as good as the surrounding film footage."[448]

In general, the cinematography of the *Star Wars* films was not commented upon in the popular press; the elaborate space battles, fantastical worlds created in Lucas' "digital back-lot," and the computer-generated characters received much more attention from critics.[449] David Tattersall, BSC, who shot the *Star Wars* films, is a curious figure in the development of digital cinematography. Tattersall has served as Lucas' de facto house cinematographer since the early 1990s. In his work on the television series *The*

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[446] David Heuring, interview with the author, November 30, 2004, transcript.
[447] See Magrid. "Exploring a New Universe", 40.
[448] M. David Mullen, interview by the author, August 15, 2004, transcript.

Young Indiana Jones Chronicles, (1992-93) he helped develop film-to-digital techniques that would be used on the *Star Wars* films. He also photographed *Radioland Murders* (1994), a live action feature written by Lucas and produced by LucasFilm that provided an occasion to refine digital back-lot techniques by creating many of the film's period sets with CGI. Although he is not a member of the ASC, he was featured prominently in the *AC* articles about the *Star Wars* films, and despite his relatively thin feature film resume, *AC* described him as an accomplished cinematographer, perhaps by virtue of his long collaboration with Lucas. Still, by his own description, Tattersall had "one of the shortest tenures on the project" when he shot *The Phantom Menace*. The movie shot sixty-five days of live action production, then spent twenty months in what *AC* called "post-production," which is to say, in the process of creating CGI worlds and characters, integrating these with the live action footage, and editing and assembling the project. In an almost two-year production cycle, the portion for which a cinematographer would expect to have the most authority was limited to a few months.

By and large, *AC*'s writers did not criticize the look or style of the *Star Wars* movies and focused on the technical problems and benefits of digital production. The craft's resistance to Lucas's methods can be read between the lines, though, as when Magrid asks Lucas in 1999, "Will the next film [*Attack of the Clones*] have its own digital look or will you *aspire to a filmic look*?" [my italics].[450] Lucas responds that his goal is for all six films to look "consistent." At this point Lucas was still arguing that digital was a replacement for film. By 2001, Lucas had backed off his controversial claims that digital cinematography was "indistinguishable" from traditional cinematography, telling Benjamin Bergery, "No, they don't look the same, but then no

[450] Magid. "Master of his Universe", 26.

two movies look the same depending on the art of photography and lighting that tells the story."[451]

This line hints at a rhetorical strategy but also a stylistic strategy that was evolving significantly as Lucas engaged with the craft community. In short, Lucas asserted that *Star Wars* was essentially classical in form and style and not at all contrary to the principles of classical cinematography. In 2001, Lucas stated, "For me, cinematography is not about technology, it's about lighting and aesthetics. It's about understanding what a good, quality shot looks like."[452] He said he appreciated *Phantom*'s "clean, nicely-lit photography" and "I like black and white, I like depth of field."[453] The only challenge, he said, is that digital images are so much sharper; the crafts would have to become "refined" to deal with them. Even as he is reaching out, though, Lucas stumbles over craft distinctions. Cinematographers do celebrate black and white photography, and they value depth of field as an aspect of cinematic language, but only in the context of the appropriate mood and moment in a story. Moreover, while expansive depth-of-field (which Lucas appears to be talking about) is associated with the golden age of studio cinematography, in the virtuoso work of studio cameramen like Gregg Toland and Victor Milner, with modern film stocks and lenses almost any depth-of-field is available, depending on the needs of the shot or scene. To a contemporary cinematographer, deep compositions are not synonymous with "film-look," rather they bring to mind video-based imaging: it is hard to create *shallow* depth-of-field in video.

Still, at least Lucas was trying to talk cinematographers' language. Tattersall made similar gestures to traditional values, saying *Star Wars* had used "classical compositions and camera movement" from the beginning and would continue to do so.

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[451] Bergery, "Digital cinema, by George", 66.
[452] Ibid.
[453] Ibid.

He adds, "It's a very solid, restrained style that is definitely not flashy."[454] With these statements Tattersall is tapping into an oft-repeated received ideology of "invisible style" as the hallmark of quality cinematography. This opens up sensitive questions, though, because invisible style is not actually invisible to cinematographers. Masterful cinematography, to cinematographers, is not so much "invisible" as "appropriate." It is expressive in a harmonious way with the rest of the production. Every shot has a style; the question is, is it the right style and is it well-realized?

The cinematography of *Attack of the Clones*, while serviceable, would not be considered especially expressive cinematography, nor would it inspire comfort in the hearts of cinematographers for "digital" imaging. Consider two brief examples. In Figure 28 and Figure 29, the Jedi knights Anakin and Obi-wan enter a crowded bar in search of an assassin. They have just concluded a dynamic, high speed chase through a maze of skyscrapers. What follows is a fairly pedestrian establishing shot as the two Jedi enter the bar, the camera near eye-level and panning as they walk by.

Figure 28. *Attack of the Clones*. Entering the bar in search of an assassin. Note the depth of field stretching well into the background.

[454] See Magrid. "Phantom Camerawork."

Figure 29. *Attack of the Clones*. The end of the shot above. The pan to this angle reveals a busy, chaotic nightclub, almost impossible to make sense of.

There is nothing "wrong" with this shot in terms of continuity or basic lighting, but I think a cinematographer would see it as a missed opportunity. The static composition, with standing crowds and a fairly stately pan, does not at first match the tenor of their search. The end of the pan reveals a crowded, chaotic space of milling club-goers. The active staging of the extras contributes to the sense of danger, as the assassin is in the crowd, but the camera does little work here. To use terms from Keating, the shot does not match the genre/scene conventions we expect at this moment. The lighting does not add much, either; it's a mix of recessed neon, incandescent chandeliers and floor lights. The ambient, non-directional light is neither dim enough to be expressive of what we presume is a dangerous nightclub, nor bright enough to suggest some other mood. The image is low contrast overall, with no pools of real black; the play of light and shadow tells us little about what is happening in this scene. We might contrast this shot with another scene that it clearly resembles, the Cantina scene from the original *Star Wars* (1976). That scene features significantly greater contrast, with directional, motivated

Figure 30. ***Star Wars: A New Hope.*** **This establishing shot of the Cantina on Tatooine is similarly smoky and populated by aliens as the club in** ***Attack of the Clones*****, but with a higher range of contrasts, more directional lighting, and a composition that invites us to scan and search the frame. The bright bar directs our attention to the next sphere of action.**

Figure 31. ***Star Wars: A New Hope.*** **This shot reveals Figure 30 to be a POV shot of Luke Skywalker and C3PO as they enter. Deeper contrasts and more directional lighting contribute to the setting and story.**

lighting from outside, tighter compositions, and a palpable atmosphere of smoke and dust.

Comparing these shots shows both the importance of cinematography and the difficulty in describing and critiquing it. A great deal of what fails in the *Attack of the Clones* shot comes from production design. The nightclub doesn't evoke an exotic,

dangerous nightclub. It looks more like a 1980s discotheque, or more to the point, like a soundstage dressed as a discotheque. The cinematography does not help us, though. We are given no clues to the significance or disposition of the two Jedi outside of their centrality in the frame. There is haze over the image that contributes to the atmosphere—from smoke or a post-production effect, we cannot tell—but this is also a common technique to reduce the excessive sharpness of video-based images—a "tell" of sorts that someone attempted to make the shot more "filmic." The two shot couplet in *A New Hope* feels more authentic and specific. Again, production design plays an important role here, but more directional, motivated light and a better genre-scene match—exotic location, shadowy characters—and the point-of-view angle of the establishing shot make it a more cohesive sequence. Perhaps more important than any single cinematographic effect is the all-around impression of the *Attack of the Clones* shot. The construction suggests a rushed, fairly compromised performance of cinematography *and* production design, more akin to an inexpensive television production than a feature film.

That supposition would be supported throughout *Attack of the Clones*. The shot above is a relatively unimportant transitional moment in the movie, but the next examples, shown in Figure 32 and Figure 33, would be considered more troubling. In this scene, Amidala, a Galactic Senator, finally concedes her growing love for her Jedi bodyguard, Anakin. In the scenes that follow she leaves her home world and travels with him to Tatooine where he avenges the death of his mother. This is a pivotal scene in the romantic sub-plot involving Amidala and Anakin; the kind of moment to which a cinematographer would be very attentive for a matching mood, composition, and emotional quality with the narrative. Romantic genre/scene conventions are present in Figure 32—dim lighting, effect-lighting from the fireplace—but incompletely realized. The balance of the composition and depth-of-field places a strange emphasis on the

background and there are distracting highlights on the fireplace, the urns, and Anakin's vest.[455] Although the reproduction here is a bit fuzzy, the original image is remarkably crisp, again contrary to the conventions of a romantic scene, which usually feature soft (even diffuse) light and narrow depths of field to isolate the performers and their emotions. The modeling on Amidala's face is sharp, not as oriented toward beauty or glamour as one might expect, and Anakin' face is in shadow, with an unexplained (perhaps unmotivated) but quite strong white backlight. Similarly in Figure 33, the two-shot is entirely conventional in composition and modeling, one might say boringly so, the entire shot is in focus from background to foreground and the fire-effect and white backlight lack subtlety.

Figure 32. from *Attack of the Clones*. Anakin visits Amadala's bed-chambers.

These two shots demonstrate the entirely functional and, in most cases, unremarkable cinematography that characterized *Attack of the Clones*. Todd McCarthy, a critic and sharp observer of cinematography, gave the look of the movie a bland, somewhat mixed review in *Variety*: "…digitally projected images looked clean and cool,

[455] I cannot say for sure if the fireplace was a practical set or digitally inserted. If it was a digital set, Tattersall would not have been responsible for lighting the fireplace or other elements in the scene and, in any case, would not be responsible for how live action and special effects were visually integrated.

with colors appearing slightly more muted than their celluloid equivalents in the 70s-80s trilogy, and the browns in dark interior scenes washing together without definition."[456] Perhaps he had the scene above in mind. Only some of these shortcomings of these scenes could be attributed to the digital origination of the movie, of course. Production design and the integration of digital backgrounds are a major contributor to the images here. But the overriding impression was that the look of the new, "digital" *Star Wars* didn't measure up to the old, filmic version. These may seem like nitpicking points to make, if not for Lucas' assertion that this cinematography was inspired by the best of classical studio cinematography from the last century. It seemed that the look didn't even measure up to the cinematography of his earlier projects.

Figure 33. from *Attack of the Clones*. Anakin and Amadala, medium two-shot with a strong, unmotivated backlight.

Despite these shortcomings in the look of the film, bad reviews of the cinematography were hard to find. I heard no verbal criticisms among cinematographers (although I witnessed several rolled eyes and noncommittal shrugs). Their reticence comes at least in part from professional decorum. As David Heuring told me:

[456] Todd McCarthy. "This Lucas Clone is a Force Majeure." *Variety*. May 13, 2002; 23.

> The guys never talk bad about Tattersall. He is one of us guys and he got a job and he did the job. And I am sure they always feel a little sorry for him, like, I will bet you that was hard….they just kind of say that he had a job and he did it. I am sure they have a lot questions for him, like how it worked. But these guys are loyal to each other and you don't hear them bad talking each other.[457]

To a cinematographer that was paying attention, what *Attack of the Clones*'s cinematography suggested was at best an immature technology applied to a very high profile project (and creating vast overestimations of the digital future); at worst it pointed to a future dominated by static, studio-bound shoots, rushed, flat, inexpressive cinematography, and poorly realized scenes that had invited well-established, effective conventions such as genre/scene or glamour lighting.

As with *The Anniversary Party*, we should see the cinematography of *Star Wars* as an example of craft struggling to find a balance between its own internal contradictions—between the conventions of classical cinema and the need to create artistic, expressive images, all in the context of the largely technical task of adapting to a new technology with different affordances and limitations. In *Star Wars* I believe a cinematographer would see the triumph of the technical and conventional over the expressive. These movies look like episodic television, produced on a schedule and budget that forecloses the possibility of artistic cinematography. Again, conventions are not one-size fits all, even for cinematographers. In the examples that follow, cinematographers apply the limitations of video cameras to create novel looks that many cinematographers found interesting or even impressive (or that they hated). In the case of *Star Wars*, Lucas and Tattersall claimed to be advancing classical values with the "non-flashy" invisible style associated with the studio era, but in many ways missed the mark of what contemporary cinematographers consider masterful cinematography. The result

[457] David Heuring, interview with the author, November 30, 2004, transcript.

was indifference to the style of the films and continued hostility to the technology that underpinned it.

VIDEO LOOK IN *PERSONAL VELOCITY*

If *Star Wars* was overly conventional and inexpressive, *Personal Velocity* goes to the other extreme, using the digital camera to create rough, low-resolution looks, lighting effects, and compositions that go beyond the boundaries of acceptable expressive cinematography, while also adhering to many basic conventions of the craft. *Personal Velocity* is a low-budget film (reportedly $150,000) that tells three thematically-linked stories, each of a woman reaching a crossroads in her life. Rebecca Miller wrote and directed the movie, which was only her second film. Miller had previously written and directed *Angela* (1995), another independent drama, for which she won the Filmmaker Award at the Sundance Film Festival. *Angela*'s cinematographer, Ellen Kuras, won the cinematography award at Sundance as well. Based on her reputation as a writer and filmmaker, Miller financed *Personal Velocity* through a start-up production company, InDigiEnt, whose mandate was to finance low budget projects made by promising filmmakers who agreed to use digital media.

By the time Miller invited Ellen Kuras to photograph *Personal Velocity*, Kuras was a respected cinematographer in the East Coast independent cinema scene. She had won several cinematographer awards and had a fruitful collaboration with director Spike Lee, for whom she shot the documentary *Four Little Girls* (1997) and feature films *He Got Game* (1998), *Summer of Sam* (1999), and *Bamboozled* (2000), portions of which were shot on digital video. Kuras was invited to join the ASC in 1999. On *Personal Velocity*, Kuras was resistant to working with digital video again, despite InDigiEnt's requirements (they were providing the equipment), and she told *AC*, "I am not a fan of DV. Shooting in Super 16 and blowing it up to 35mm offers much better quality and

control."[458] The only reason she agreed to the shoot, she said, was for the chance to work with Rebecca Miller: "We have an intense creative understanding."[459] As it turned out, *Personal Velocity* won a second Sundance award for Kuras, as well as an Independent Spirit Award for cinematography. It was the first movie to win either award that did not originate on film. David Mullen described the film as significant, although by 2002 there was already a surge of interest in digital moviemaking:

> [*Personal Velocity*] was important because you saw some DV films being shot by big name DPs. You had Ellen Kuras shooting, she's probably one of the most important figures shooting legitimate features in DV. Three years in a row the best cinematography award at Sundance went to a DV feature, *Personal Velocity*, *Quattro Noza*, then *November* [also shot by Kuras]. Three years in a row between 2002 and 2004. I'm not sure why. They're all exciting visually and all artistic, but to win three years in a row suggests a bias toward DV or they feel they need to reward these big cinematographers for using the tools of the low end independent filmmaker. But they are all excellent work. *Personal Velocity* was very artisitic. But these were great DPs so they are going to great stuff, even with low-end video equipment.[460]

In 2002, *Variety* critic Todd McCarthy wrote a column in *AC* titled "Sundance and the Digital Evolution," in which he lambasted the abundance of digitally-originated movies at the winter festival, many of which won awards alongside *Personal Velocity*. He said that the digitally shot narrative features at the festival "looked like hell," and that "the films they honored were worthy in spite of the way they were shot, not because of it." Notably, though, McCarthy praised *Personal Velocity*:

> …composed of intimate scenes played out in interiors, the careful planning and lighting implemented by Kuras are commensurate with the close attention paid to every other aspect of production, notably the writing, editing, and lead acting… the simplicity of the images contributes to the spare intensity of numerous scenes.[461]

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[458] Rachael Bosley. "Sundance Report: Personal Velocity." *American Cinematographer*. April 2002, 81.
[459] Ibid.
[460] M. David Mullen, interview by the author, August 15, 2004, transcript.
[461] Todd McCarthy. "Sundance and the Digital Evolution." *American Cinematographer*. April 2002; 133.

In the case of *Personal Velocity* we see a relatively young, risk-taking cinematographer reluctantly taking on the challenge of digital cinematography. She was new to the elite precincts of the craft culture, but in a solid collaborative relationship with her director. Rather than pushing the medium toward conventional cinematography, though (as Tattersall and Bailey did), she used it to create images considerably more abstract and rough than ordinary motion picture imaging. For instance, Figure 34 shows a frame from a shot of an actress walking away from the camera, the image captured looking directly into the sun, overwhelming the camera sensor and blasting the image into a nearly-abstract wash of yellow light and barely legible forms. This shot is part of flashback in the first story and throughout the segment Kuras signifies flashbacks with unusual stylistic choices, including still frames, canted compositions, and the like. Using style as a signifier of shifting narrative time is a classical technique, of course (for example, switching to black-and-white film or tonal shifting, or distorting the soundtrack), but the aesthetics of this image owe less to classical cinematography than art photography, music video, and experimental documentary.

Figure 34. Abstract pictorialism in *Personal Velocity*.

Kuras described some of the techniques she used to create looks that were not obviously "video" in origination, such as filling rooms with smoke to "cut down the hyper-realism of DV," and using neutral density filters and opening the camera's aperture to narrow the depth-of-field. She also describes seeking out darker, more shadowy interiors, insisting on shooting a wide-screen image (so that it could not be reduced later to a TV-shaped screen) and avoiding direct sun (the above image notwithstanding).[462] Figure 35 shows an example of complex framing with some of these techniques in action. Not that these are the same techniques other cinematographers have described in this chapter for diluting the "video look" of their cinematography, but here Kuras uses them in a variety of ways, not merely to reproduce classical film style. Some shots of the film recall Bailey's shots from *The Anniversary Party* in their simple domestic drama classicism but with even more pronounced non-classical lighting choices (Figure 36 and Figure 37).

[462] See Bosley, "Sundance Report."

Figure 35. Complex framing in Personal Velocity. Note the use of depth and silhouette, the canted camera angle, overblown highlights, smoke effects, and soft focus.

Figure 36. Medium two-shot from *Personal Velocity*, shot documentary style in direct sunlight. The blown-out highlights and casual blocking recall similar arrangements in *The Anniversary Party*.

Figure 37. Delia (Kyra Sedgwick) in the battered woman's shelter, *Personal Velocity*. Her shocking injuries, a low resolution image, soft frontal key and harsh backlight creates an unusual synthesis of documentary realism and classical beauty. This is a use of glamour lighting that seems almost ironic in intent.

As she describes her working methods in *AC*, online sessions, and Q&A sessions with students, Kuras' makes clear her investment in conventional cinematography.[463] For example, she describes her insistence on using widescreen for *Personal Velocity* as "a bit rebellious," since the camera's internal chip was standard 4:3 (Academy ratio). "Everyone was telling me to shoot 4:3 and mask off," she said, "but I put my foot down…I wanted to control my own framing."[464] She also insisted on monitors for herself and her second camera operator, so they would not have to rely on the camera's inadequate viewfinder. She also hired her usual camera assistants and gaffers, and she developed a unique shooting plan to cover most of the film's scenes in what she called "two moving masters" to help ensure continuity on the tight production schedule. She

[463] See Bosley, "Sundance Report." Also, International Cinematographers Guild online discussion session with Ellen Kuras, June 23, 2001 (author notes) and Master Class at the Department of Radio-TV-Film, University of Texas, March 9, 2009 (author notes).
[464] See Bosley, "Sundance Report."

described varying visual styles between the three stories, such as using handheld in Delia's story to capture the "frantic quality" of her flight from her abusive husband.[465]

Once again in this case we see a cinematographer grapple to find a balance between classical style, expressiveness, and the affordances and limits of a new technology. Kuras's solutions are different from those of her craft colleagues: she is more experimental, working with a trusting collaborator on a low-budget project, and thus she is free to roam toward a more mannered, expressive range of solutions. Still, the balancing the conventions of genre, character modeling, and composition serve a crucial role in solving the particular problems of storytelling, in a low-budget, DV-based mode of production.

COLLATERAL

In stark contrast to *Personal Velocity*, *Collateral* is a male-oriented action film, a big-budget Hollywood crime drama—the sort of genre product that has been bread and butter for the movie business for decades.[466] The plot unfolds over the course of a single night, as a Los Angeles taxi driver, Max (Jamie Foxx), is forced to drive a contract killer, Vincent (Tom Cruise), to a series of deadly appointments and increasingly dangerous confrontations, until Max finally intervenes to save his own life and that of the killer's final victim. The film's reported budget was $65 million; it was co-produced and distributed by Paramount Pictures and DreamWorks Pictures and featured two of the highest paid stars in entertainment at that time. It was distributed widely domestically and internationally, on over 3000 screens in U.S. alone, and the reported gross receipts were over $100 million. The director and producer, Michael Mann, is a well-established writer,

[465] See Bosley, "Sundance Report."

[466] To be sure, over the last two decades Hollywood has come to rely more on the strategy of franchise pictures built on transmedia properties and "tentpole" distribution strategies. Nonetheless, certain genres such as thrillers, comedy, and horror continue to be staples of studio programming.

producer and director, with many credits in television and cinema dating back to *Miami Vice* (the TV series) in the 1980s, and including award-winning films such as *Heat* (1995), *The Insider* (1999), and *Ali* (2001).[467]

Collateral has two credited Directors of Photography, Paul Cameron and Dion Beebe. Duplicate credits for cinematography are an oddity in studio production and the presence of two experienced cinematographers in the film's credits is an important part of the story of this film as a craft text, discussed in more detail below. *Collateral* received enormous amounts of press for its "digital origination" and being the first big-budget star-driven picture produced with digital cameras. In fact, *Collateral* was a multi-format production that included 35mm film, digital video (Sony's F900 cameras), and the Viper Filmstream (manufactured by television equipment firm Thomson Electronics). The Viper was one of the first digital "data cameras" that recorded image data directly to hard drives in what was called "raw" or uncompressed, unprocessed form. As such, it was able to preserve a higher resolution, greater color fidelity, and higher sensitivity to light than digital video cameras like Sony's F900. The Viper was still not a "production camera" (as discussed in Chapter 6); it lacked the attachments, gear, and "ergonomics" of film production cameras. It also required a "tether," or data cable, to its hard drive recorders, limiting its mobility.[468] Despite these drawbacks, Mann insisted on using the digital video and digital data cameras for one primary reason: he was seeking a specific "video look" that captured the Los Angeles night sky in a way that film could not. According to Mann, he wanted to "see the city" in a way the film would not allow.[469]

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[467] Selected scenes in *Ali* were also shot using digital video, what Michael Mann called a trial run for the technology. *Ali* was photographed by Emmanuel Lubezki.
[468] "Collateral" *Daily Variety*. January 7, 2005 (special section); A16.
[469] Mark Olsen, "Michael Mann: Paint it Black." *Sight and Sound*14:10. October 2004; 16.

VIDEO LOOK AND *COLLATERAL*

The video-look of *Collateral* is almost entirely centered on its relationship to darkness and night, that is, shots in which the quality of the blacks in the frame diverges from what would be acceptable within the confines of "film-look" (or perhaps even possible with film). Since its earliest days, cinematography has been concerned with the both the challenge of rendering darkness and how to do so in an expressive fashion as, for the first cinematographers, simply exposing the film to adequate light (that is, banishing darkness) was the foremost concern. Later, cinematography's claims to and disputes around artfulness often revolved around the quality of blacks in their photography—would they be the soft, milky gray-blacks of the pictorial style popular in the 1920s, or sharp, high-contrast blacks of the 1930s and 1940s, or the daring black voids found in the frames of the more expressionistic film noir cycle.[470] In making *Collateral*, Mann made plain his idea of what Los Angeles looked like at night: a sky awash with light pollution, streaks of neon and monolithic skyscrapers lit from within, airplanes, helicopters, smoke, and other urban detritus littering the horizon. *Variety* critic Todd McCarthy—not usually a fan of digital production—approved of the results:

> Compared with the rich, intense color palettes Mann has employed in his previous work, *Collateral* has a more monochrome look that, paradoxically, combines a sense of deep darkness with a certain washed-out thinness and lack of visual weight. Punctuating this at times, though, are the pervasive lights of the sprawling city, the appearance of which justifies the use of the new technology; to be sure, the sight of a succession of planes lined up to land at LAX at night, or the spooky yellow glare in coyotes' eyes, have never been so strikingly or realistically rendered as here.[471]

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[470] See Keating, 221. Keating explores the relationship between cinematography and photography in the mid-century and how trends in art, fashion, and documentary photography moved between the craft areas. Although styles waxed and waned in popularity, unfashionable techniques (such as deep focus in the 1920s) remained important to cinematographers as solutions that could help balance conflicting conventions within classical style.

[471] Todd McCarthy. "Collateral: Man on Fire." *Variety*, August 2, 2004; 22.

Figure 38 demonstrates several aspects of what cinematographer Stephen Lighthill described to me a "video vision of night."[472] According to Mann, this look would be "impossible" to create on film. [473] In this frame the sky has an unusual gray-brown tonality, glowing with just enough ambient light that the trees in the background are silhouetted against it. The complex composition holds almost everything in focus, from street lights, car headlights, and storefronts in background, to Vincent in the middle ground, and Max walking into a medium close shot.

Figure 38. *Collateral*'s "video vision of night."

In Figure 39, a similarly illuminated shot has Vincent in a dim close-up, with Los Angeles's downtown buildings fully visible in the distance, although in soft-focus with the city's iconic palm trees silhouetted in the middle ground. Although the background is revealed through ambient light, the close-up is lit in a conventional manner, with a cross-light key from the city-side, and a backlight from the right. Vincent's face is bisected by a

[472] Stephen Lighthill, interview by the author, August 20, 2005, transcript.

[473] Richard Crudo disputed this claim to me, relating a story in which he took an Arri 2C film camera into the streets of New York with the goal of refuting Mann's statement that a film camera could not capture a night sky like video did. It's worth noting, though, that Mann is describing not just an ability to capture a skyline or city streets, but complex compositions with people and motion, framed in depth. Richard Crudo, interview by the author, August 26, 2005, transcript.

strong shadow—not completely black—that supports the narrative moment: Vincent invading a dark apartment complex to commit his first contracted murder.

Figure 39. Collateral showcases downtown Los Angeles and palm trees in silhouetted against a night sky, an unusual look cinematographer Dion Beebe called "exciting."

Although the quality of darkness in these frames may not be familiar in cinema, nor to cinematographers, it is certainly informed by classical notions of quality. Mann described the overall look as "realistic" in the sense that it mimics how one sees an urban night-time environment—shades of gray and relatively few deep, impenetrable blacks. The appeal to human perception, of course, is a common refrain in descriptions of classical technique, the notion that film style closely models the way humans actually see.

Mann also appealed to realism in the example that follows, a scene from the dark interior of Max's cab (see Figure 40). A great deal of this movie (a third, according to Dion Beebe) takes place inside the cab. Mann described a goal of creating a "realistic" lighting environment inside the cab. In this case, by realistic he meant both mimicking human perception but also shots that looked "unlit," with no clearly directional light to model the characters' faces (contrast with Figure 39). The light was meant to be seen as ambient illumination, reflected from the exterior city streets or panel lighting in the

automobile and (this was a key point) the city streets had to be visible: Los Angeles, Mann declared, was as much a character as the actors in his film and he wanted it to be visible all the time.

This "unlit" interior/exterior effect actually required considerable effort on the part of the cinematographers, such as developing a new lighting "instrument" built from solid-state electroluminescent lighting strips that could be pasted onto interior surfaces of the cab. Even with these new sources, the lighting effect created an unusual and difficult situation for the cinematographers, requiring them to over-light the actors in order to see their faces and still keep the city exteriors in focus. The light level on the actors' faces was then unacceptably high, but those levels were brought down *in post-production* by colorist Stefen Sonnenfeld using DI techniques. In *AC*, Paul Cameron described

Figure 40. *Collateral*'s cab interiors were meant to look "unlit," but still allow for seeing the actors' faces and showing the urban setting outside the cab.

shooting these scenes as looking "horrible and incredibly overlit" on his monitors: "It was very hard to wrap my head around what we were doing and it went against every instinct I have as a cinematographer."[474] Cameron was in a situation quite similar to John Lindley's on the production of *Pleasantville*: crafting partial looks for completion in post-

[474] Jay Holben, "Hell on Wheels," *American Cinematographer*. August 2004; 40.

production. In any case, the effect is not entirely successful, in my judgment, as the faces still seem unrealistically bright for being in an "unlit" car interior at night. However, Mann's goal of keeping the characters connected to the city has been achieved with a remarkable deep-focus effect reaching far into the night-time background. As with *The Anniversary Party*, a kind of compromise is reached between competing classical goals—respecting the narrative structure, showing the actor's performances, while adhering to Mann's somewhat mannered stylistic choice.

The same tension between narrative, classical style, and Mann's stylistic goals is visible in other shots as well. Many shots in the film take place as the two men are driving from place to place in Los Angeles, and Mann takes the opportunity to insert cutaways that highlight the city, often using the characters or cab as little more than a kind of spatial reference, as in and Figure 42. Both are emblematic of the many brief shots that showcase industrial cityscapes. In , the motion in the background contrasts with the stasis of Max tucked into far left of the frame. In Figure 42, the shot never brings Max's face into focus at all, emphasizing the cooling towers and

Figure 41. *Collateral* included many shots that framed characters within a dominant image of the urban setting.

Figure 42. Many cutaway shots in *Collateral* illustrate the industrial city by night, utilizing the video camera's ability to detect low levels of ambient light.

their emissions. There is a pervasive sense of night in these shots but an absence of true, deep blacks. Video-look affords the ability to see inside and beyond the car.

By the end of the movie, visibility, vulnerability, and the urban environment emerge as major themes, as Max stands on the roof of a parking garage in downtown Los Angeles, trying to reach Vincent's final victim, who works in one of the skyscrapers that surround the garage (see Figure 43). In this shot, the sky is once again of an unusual tonal quality that silhouettes the monolithic office buildings. According to the cinematographers, the buildings required no special illumination as the video camera was able to register enough from ambient street light and interior lights to make them visible. This is a case where a cinematographer could have created this look (with the possible exception of the sky) but, according to Mann, the quantity of lighting fixtures, electricity, and crew would have been prohibitive. The novel looks created for *Collateral* demonstrate how new technical affordances are used to solve traditional problems in production (how do you light a skyscraper?) but also create new challenges (how do you improve effect lighting for the interior of car?), but always do so in reference to existing conventions and conceptions of style. The look of *Collateral* received a mixed reception

from cinematographers, but perhaps more troubling was how that look was achieved and who received credit for it.

Figure 43. The final scenes of Collateral return to downtown Los Angeles, showcasing the skyscrapers and warrens of parking structures and office blocks.

CRAFT REACTIONS TO *COLLATERAL*

In 2004, the Entertainment Technology Center at USC invited Michael Mann to bring *Collateral* to its occasional digital screening series at the Digital Cinema Laboratory in Hollywood. In the Q&A that followed, ETC director Charles Schwarz asked Mann how he decided what scenes should be shot in which formats—film or digital? Mann replied that he considered the digital camera to be a new film emulsion, which is to say, he would choose the format based on the needs of the story and the expressive demands to make a scene effective, just as he would any film format.[475] These are actually two different claims and both are highly subjective. What, after all, does a story "need?" And as I'll show below, many cinematographers did not agree with Mann's answers. What seems important to me is that Mann is representing the cinematography of the film and makes clear that the choice of "emulsion," ultimately, was his choice to make. The positioning of Mann as the *auteur* of the film's novel style is of a piece with

[475] Charles S. Swartz, interview by the author, March 27, 2005, transcript.

the trade stories that surrounded the film, including the significant production challenges and conflicts, the dismissal of the original cinematographer, and the elevated importance of the post-production personnel.

Based on these stories, *Collateral* aroused a variety of opinions among cinematographers. Some saw its mixed-media cinematography and unusual look as a harbinger of the future; others denounced it as ugly and a thinly veiled flack for digital camera manufacturers. The fact that original cinematographer Paul Cameron was released from the show four weeks into production was cause for considerable discussion. David Heuring said,

> It's amazing the passions that this topic brings up. You bring up *Collateral* and some people say that was great, digital really added to the movie. It gave L.A. this hard slickness that had not been depicted in movies before. Those who live in L.A. know that that L.A. exists…it was a great representation of that. Another guy might say, I couldn't look at it, man, it was ugly. Oh my God, people get really pissed off about it. You know, I kind of liked the movie, but I don't say that in front of my Kodak friends. But, a cameraman got fired off that. I think that there is a back story there and I don't know whether you could dig it out.[476]

Mann's reputation as a stylist preceded and conditioned the reception of the film. When I asked director Mike Figgis about *Collateral*, he said: "I haven't seen it yet. He has a great eye, though, and he is obsessed with color and saturation. All his films have this trademark. So, I imagine it looks pretty good."[477] Cinematographer Michael Goi was more measured in his response, saying,

> I admired the feeling of experimentation that went into making that. You know, I think it's great when you can take that kind of real budget and those kinds of stars and play with formats and see what they are capable of. There should be more freedom to do that. Results-wise I don't know that it was necessarily better than it could have been on film.[478]

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[476] David Heuring, interview by the author, November 30, 2004, transcript.
[477] Mike Figgis, interview by the author, November 29, 2004, transcript.
[478] Michael Goi, interview by the author, July 24, 2005, transcript.

Cinematographer Bill Bennett was dismissive, claiming that the production was given the cameras to use for free in exchange for all the press they knew would result, and, moreover, the film was ugly:

> Bennett: There were more articles up and down in both the trade press and the civilian press about what, in my opinion, was an awful looking movie. Did you see it?
>
> Interviewer: Yes, I did.
>
> Bennett: Awful. Jamie Foxx in the front seat of the cab looked like a cardboard cut-out with moving lip and his eyes…no change whatsoever.
>
> Interviewer: Do you believe there was a stylistic choice at work there?
>
> Bennett: You know what? He is the director. He and his cinematographers chose, they claim, to do it for aesthetic reasons. I just don't think the look was a very nice one.[479]

In general, though, cinematographers seemed to see the film as the wave of the future, especially the "hybrid" nature of the production. Even Bennett said:

> We may see movies that shoot both film and digital origination when they both serve the purpose. You know, maybe all the stunts and effects and exteriors will be done on film and the dialogue, interior scenes will be done digitally. And blended together. Maybe. *Collateral* was kind of that way.[480]

Collateral was "kind of that way," but significantly the cameras were used in precisely the opposite manner than Bennett suggested: interiors were shot with film and exteriors shot with video (more about that below), but the notion that video- or digital origination might have a legitimate place in production had come some distance from the days of the "death of film" debate. Richard Crudo, who was president of the ASC at the time I interviewed him and deeply skeptical about digital origination, said:

> To get nice images you get the feeling that you want up there. It doesn't matter if you do it through the end of a coke bottle; it really doesn't matter. What matters is the internal process of bringing this thing to life, you know? And the technology

[479] Bill Bennett, interview by the author, August 22, 2005, transcript.
[480] Bill Bennett, interview by the author, August 22, 2005, transcript.

> is secondary in a sense that it delivers what you want and that's where it should end. Who cares how you did it? You got the emotion across.[481]

Crudo was using hyperbole, of course, and for the most part defended film as a vastly superior medium for capturing the emotions he is referring to. Nonetheless, *Collateral'*s combination of believable performances, adherence to genre, and the novel look created with the video and digital cameras impressed some in the cinematographer community. Stephen Lighthill said:

> You know, I think every shooting situation has its own politics, and demands, and budgets but the two things on this list that were really impressive to me were *Dancer in the Dark*, because of the way he did multiple DV cameras and I thought that was pretty extraordinary, and *Collateral* I thought was interesting. I didn't think it was extraordinary cinematography but it was pretty awesome for what they were trying to do, and this sort of video vision of night they wanted? It was amazing work.[482]

Similarly, Patrick Stewart said:

> I was very, very impressed with that movie. Obviously they spent a lot of time in post to get a certain look, to get certain colors that you just can't get straight out of the camera night after night after night without spending way too much time prepping. But, being that it was shot at night and video and contrast are enemies of one another—so, you get headlights or any kind of lights and normal exposure in the same shot at the same time—it really showed to me that F900 handles those lights way better. The F900 really is the milestone to me in video filmmaking.[483]

One aspect of *Collateral*'s production that confused cinematographers was the decision when and how to use the film and video cameras. As Bennett implied above, given the video camera's limitations as an imaging device, a cinematographer's professional advice would be to use it in a situation where the lighting and setting were most controlled, i.e., on an interior location or set. As David Mullen put it:

> I thought it was odd that he shot film when he had enough light, and he shot High-Def when he didn't have enough light. It seems odd because you'd think, High-

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[481] Richard Crudo, interview by the author, August 26, 2005, transcript.
[482] Stephen Lighthill, interview by the author, August 20, 2005, transcript.
[483] Patrick Stewart, interview by the author, July 22, 2005, transcript.

> Def in a controlled situation would be better. Not better than film, but you could made the High-Def look better than it does in the uncontrolled situation. I'm not quite sure the logic there.[484]

Michael Goi expressed similar thoughts and added that he felt a difference when watching the filmed scenes:

> When I was watching it in the theatre and the scene came up in the jazz club, there was just a subliminal feeling where all of a sudden everything just felt richer and I felt more involved. I found out after the fact that that scene was shot on film.[485]

In Figure 44 and Figure 45, the different quality of color, skin tone, and selective focus are clear. This scene was shot with 35mm film, as were all of the interior settings. I believe cinematographers' responses to this "backward" workflow reveal some important insights into craft culture and the limits of craft authority. At one level, they reveal craft as a taste culture, loyal to and deeply invested in its own preferences for aesthetic experiences. The experience of film is "subliminally" more affecting, richer, and involving. They also reveal the importance of past practice and the cinematographer's sense of responsibility to choose "horses for courses," as one informant told me.[486]

Figure 44. Interior scenes in *Collateral* were shot using 35mm film.

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[484] M. David Mullen, interview by the author, August 15, 2004, transcript.
[485] Michael Goi, interview by the author, July 24, 2005, transcript.
[486] Cinematographer Bill Taylor said this to me at a demonstration of the Panavision Genesis camera held at Panavision Corporate Headquarters for the Visual Effects Society in Los Angeles, June 2005.

Most importantly, though, I think this anecdote reveals a source of craft's limitations as a source of stylistic change. This is not to say that cinematographers are not creative workers—I believe quite the opposite—but rather it reveals the structural limits to creativity in the craft-creative relationship within the traditional mode of production. There is a limit to how far a cinematographer (or other craft worker) may overturn convention within the purview of their craft traditions and role within the specialized division of labor. After all, Michael Mann's rationale for using the digital cameras in the city streets (where, as Mullen said, there "wasn't enough light") was precisely to accomplish a novel look, to represent L.A. as he had not seen it before on screen. To that stylistic end, he was willing to sacrifice certain conventional sacred cows, such as finer modeling on the faces of star actors, smooth tones of black with no "noise" or distracting visual artifacts, richly saturated colors, and so forth. These are important conventions to cinematographers; indeed, failing to meet some conventions (flattering light on a star's face, for instance) would in most situations cause a cinematographer to be fired. The "tool" of technique is not arbitrary, a mere artistic choice; it is both expressive but also the stuff of job descriptions and reputation. Thus, we can see how it would be incumbent upon an experienced, professional cinematographer like Bill Bennett to recommend precisely the opposite production tools and workflow that Mann demanded.

Such tensions might also explain, in part, the firing of *Collateral's* original cinematographer, Paul Cameron. As might be expected there are no unvarnished public accounts of how Dion Beebe came to replace Cameron three or four weeks (depending on the source) into production. *Daily Variety* reported that Cameron "will only say that he got a wonderful R&D education on the project."[487] *AC* reported that he left over "creative differences," after spending several months shooting camera tests, designing the

[487] "Collateral: Oscar preview special section." *Daily Variety*, January 7, 2005; A16

workflow and special lighting instruments, and developing the look with Mann, his longtime Digital Imaging Technician Dave Canning, and colorist Stefan Sonnenfeld. Dion Beebe referenced the delicacy of the situation, saying:

> Replacing another cameraman was something I'd never done before and would not normally consider doing. Every cinematographer has his or her own identity, sense of working and lighting style, and no one wants to step into a situation where he's merely there to replicate someone else's work.[488]

On the other hand, Beebe said, "Michael has a very strong visual sense, and on a Michael Mann film, you're working very closely with him to realize that." The implication seems clear that Cameron, for all his work collaborating on the look of the film, would not be credited as an architect of that look.

Although there was no public sign of tension between the cinematographers and Sonnenfeld on *Collateral*, colorists' role in designing and realizing looks was emerging as a point of conflict. Sonnenfeld was one of several top colorists (most worked in advanced post-production facilities like Technicolor or LaserPacific) who was gaining notice by directors and producers as a valued collaborator. Sonnenfeld has been the subject of several features in *Variety*, such as one in late 2004 in which Michael Mann said "he's an artist, he's worth every penny."[489] More recently, producer and director J.J. Abrams called him a "wizard ally," after his work on *Star Trek* (2010).[490] Sonnenfeld is an associate member of the ASC, and a founder of his own post-production firm, Company 3. When NPR ran a feature on Sonnenfeld in 2008, John Bailey was moved to address the valorization of the colorist in an *AC* opinion column titled, "The DI Dilemma: Why I Still Love Celluloid," stating, "[The NPR story] confirmed my own worst imaginings about the diminishing role we are facing over the creative control of our

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[488] Holben, "Hell on Wheels."
[489] Steve Kotler, "The Colorist," *Variety*, December 2004 p 108.
[490] David Cohen "This Wizard Casts a Spell with Color" *Variety,* June 15, 2009.

work."[491] This set off a round of letters and response columns through 2008 and 2009, including one that gently mocked the "grand tradition of grumpy cinematographers."[492] Noted voices lined up in defense of (Roger Deakins) and protest of (John Toll) the DI. The debate centered on the creative affordances of the technique, but also, as Toll said, "DI suites seem to be getting more crowded by the day."

In early 2009, Bailey was working on *He's Just Not That Into You* (2009) when New Line Cinema demanded that the film go through a DI. Bailey: "We didn't want the DI process, the studio promised we could finish photochemically, and then, when we were getting ready to cut the negative they changed their mind. We were stunned."[493] Bailey requested Sonnenfeld for the DI. In June, *AC* published a "conversation" between Bailey and Sonnenfeld about their collaboration. The joint interview was cordial but the tensions were clear; the exchange was a remarkable document of two craft areas talking past each other. Bailey maintained that the DI was unnecessary and an erosion of the cinematographer's creative contribution; Sonnenfeld made an argument for the colorist's work as a "complement" to the cinematographer, but that ultimately, with post-production relying more on digital mastering, they were indispensible. At one point, Bailey complained that colorists try to create "answer prints…but you really have no idea what the negative looks like." Sonnenfeld responded: "That's where I like to feel a little snobby, if you will, because I talk to cinematographers every day about their negatives. I'm not just sitting there pushing buttons." The article ends on a note that is something less than détente. Bailey says, "I know I'm on the losing side of this." Sonnenfeld

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[491] John Bailey, "The DI Dilemma: Why I Still Love Celluloid," American Cinematographer (June 2008), 92-97.
[492] Jim Stinson, "Forum Riposte," *American Cinematographer* 89:8 (August 2008), 10.
[493] Quoted in Jon Silberg, "Post Focus: Cinematogaphers, Colorists, and the DI" *American Cinematographer* 90:6, (June 2009), 78

concludes: “If you want to be a great filmmaker, you have to understand post-production. You’re going to get torched if you don’t.”

The digital imaging technician (DIT) on *Collateral*, Dave Canning, was another new collaborator for the cinematographers. While his role was not as threatening as that of the colorist, the DIT was emerging as a significant player. Canning has worked with Mann on each of his films since *Ali,* under various titles. He was also involved with *Chicago Hope*, one of the first primetime TV series to adopt HD cameras, in 1998. *AC* profiled that program in April 1999, focusing on the collaboration between the show’s DP, James Bagdonas, ASC, and the equipment house, Plus 8 video (and Canning’s employer at the time). Plus 8 provided the Sony HD cameras and helped design the workflow. According to the article, several craft practices on set were affected, including techniques used to soften the light on actors’ faces, difficulty with rack focus, and, most troubling, the tendency of the video camera to make the hospital set “look like a set.” Bagdonas changed his lighting and lens choices to compensate. Canning promoted the video workflow, saying, “In film, they block, light and shoot. With video, we block and light, but then let the video shader look at the image and make the necessary adjustments. Think of it like this: we’re doing exposure, color correction, and work printing in real time It doesn’t happen later in the lab.” This speaks to the greater flexibility and immediacy of video, but it also clearly foreshadows Bailey’s concern about other technicians making “answer prints” without adequate supervision from a cinematographer. This workflow seemed acceptable to all involved in the context of episodic television, but it might have become more problematic a few years later when Canning joined Mann’s team in feature production.

Figure 45. Close-up from *Collateral*'s Jazz Club scene, shot with 35mm film. Contrast with the skin tone and colors in Figures 10 and 11.

As the quotation from Dave Heuring indicated above, cinematographers noticed the dramas around *Collateral* and wondered at the implications. David Mullen attributed them to creative differences and working relationship:

> Cameron didn't get along with Michael Mann probably. He is very hard on his DPs. It could have been aesthetic reasons. Michael Mann wanted that unlit look, soft, murky light. Cameron might have felt it was getting too mushy looking. Really an issue of lighting aesthetics. That's just a guess. Cameron's usual style tends to be Storaro-esque, strong, contrast-y lighting, not underexposed, soft, ambient lighting. Mostly he's known for doing *Swordfish* and *Gone in 60 Seconds* and now *Man on Fire*. He went on to shoot *Man on Fire* with Tony Scott who can't be the easiest director to work with. They apparently got along great.[494]

Mullen implies that Cameron decided to leave the production on his own. Leaving aside how and why Cameron left and the interpersonal conflicts of this situation, this story, those of Sonnenfeld and Canning and the craft interest in these negotiations reveals the dilemma that the new imaging technologies created for cinematographers. Roles and lines of authority were becoming complicated and open to trespassers.

Much of the *AC* feature on *Collateral* (meaningfully titled "Hell on Wheels") was dedicated to describing the challenges of adapting the F900 and Viper cameras into

[494] M. David Mullen, interview by the author, August 15, 2004, transcript.

production-ready cameras—the lack of accessories like matte boxes, base plates; the limitations of the data umbilical cords, and so on—and the contortions required of the cinematographers to fit into the show's workflow, trying to match the different footage formats, creating lighting schemes inside the cab, and the like. Other problems cited in the article: the recording system of the camera was judged to be unreliable and the studio demanded back-up systems, the camera viewfinder could not show the operator the true anamorphic image, buttons were placed where they could be easily bumped and settings changed accidentally. Whether Cameron quit or was fired, one gets the sense he was not sorry to leave. The technological challenges were enormous, the signature look of the film was not his creation, and, like other cinematographers I spoke to, he may not have agreed with the fundamental deployment of the film and video cameras. Indeed, if he believed the style of the film did not represent his past work or work he wanted to do in the future, then he had ample incentive to leave. To the extent that Mann chose to collaborate more closely with the DIT Dave Canning and colorist Stefan Sonnenfeld, Cameron was a more expendable quantity in the creative equation of the film; in an already fraught technological environment, these would be compromises an experienced cinematographer was not used to making.[495]

For cinematographers, the question of credit has always been a vexed one. As a below-the-line worker, they expect little public notice of their contribution to a movie, but, in the context of the industry, recognition and reputation are crucial for craftspeople. It leads to the next job, higher day rates, or more prestigious projects. In the making of *Collateral*, the process of actually designing and realizing the novel look of the movie

[495] There are other reasons to think that Mann valued Sonnenfeld over his cinematographers. In the director's commentary on the *Collateral* DVD, Mann does not mention Cameron or Beebe by name at all, but does mention the DI process several times as instrumental to the film's look. He also credits the "video cameras" for the look of the sky, but not the cinematographers. On the other hand, Mann has had a long-term collaboration with cinematographer Dante Spinotti, who has photographed five movies for him.

was more diffuse than in a typical feature film—spread between Mann, Cameron, Beebe, Canning, and Sonnenfeld (not to mention production designer, art department, and so on). In that environment of dispersed credit, the representation of Mann as the authorial voice comes to the fore. Certainly, in the popular press and the trade press, *Collateral* was positioned and understood as a "Michael Mann film." In the popular press this is a product of marketing and Mann's past successes, of course, but, I would argue, even within the industry Mann's authority is extended to an unusual degree. His willingness to meddle in the conventions of cinema and take on stylistic and technological risks while adding new collaborators created a conundrum for cinematography as a craft culture dedicated to measured and incremental changes.

I hasten to add that cinematographers are not unfamiliar with compromise. They are often forced to balance contradictory conventional stylistic needs. They sometimes sacrifice one aesthetic value for another to create looks and moods in line with convention and they invent new looks, as each of these films demonstrated. Indeed, as Keating has written, solving such puzzles has been a major part of the craft of cinematography since its earliest days.[496] A master cinematographer is one who works within the conventions of contemporary craft technique while also finding pathways to expressive, distinctive, surprising shots, and in doing so puts subtle pressures on that inherently conservative craft system to "push forward" the art of cinematography.

In the example of *Collateral*, I think we see this conception of cinematography bumping up against the authority of a director with considerable sway as a stylistic innovator and a producer of his own films. Mann's willingness to push the capacities of an untested, unknown technological system revealed fault-lines in that system of authority, creating conflict with his cinematographers. That tension is also revealed in an

[496] Keating, 266.

interview Mann gave to *Sight and Sound* magazine, in which he said, "Digital isn't a medium for directors who aren't interested in visualization, who rely on a set of conventions and aesthetic pre-sets, if you like."[497] The cinematographer, in Mann's estimation, is an agent for convention—as indeed they are expected to be. Even in their search for interesting, novel images, cinematographers ignore convention at their peril. Dion Beebe told *AC* that Mann instructed him as a general policy to "make the fill light the key light."[498] Such an instruction may have been useful shorthand for describing the dim, night-time ambiance that Mann wanted. But what does such an instruction mean to a cinematographer? It flies in the face of a cinematographer's conception of how lights are used to create mood, composition, and story; how shots are constructed in a balance and tension of key and fill, effect and genre and a dozen small illusions. Stylistic departures are welcomed in the margins of craft, but innovation is a kind of hot potato. You might not want to be the one holding it when the music stops. When it works, credit goes to the director. When it doesn't, blame can easily fall on the craft worker.

CONCLUSION

The production of these four films, *The Anniversary Party*, *Collateral*, *Star Wars: Attack of the Clones*, and *Personal Velocity*, along with the trade stories and deep texts that surrounded them, was part of a wave of films that shaped the discourse around cinematographers' shifting authority and the use of video and digital production cameras. Cinematographers have for most of their history accepted the role of "guardian of the image" as the central precept of their craft tradition. They were responsible for safeguarding the physical asset of the shot footage as well as designing shots and the overall look, and leading the team of technicians that maintained that look through the

[497] Olsen, "Michael Mann: Paint it black."
[498] Jay Holben, "Hell on Wheels."

course of production. In this task they were guided by craft conventions such as figure modeling, effects lighting, genre lighting, and principles of composition, as well as their knowledge of the 35mm film-based workflow and the aesthetic foundation of "film-look."

After 1998, though, they would increasingly find themselves running on a broken field of technical and stylistic change, asked to create or reinterpret classical style through new "capture technologies." The very word "capture" was offensive to some, implying a kind of haphazard or opportunistic creative process rather than the thoughtful application of technique to particular artistic challenges, which was how they perceived video- and digital-based cinematography. As *The Anniversary Party*, *Collateral*, and other movies from this period demonstrated, those challenges seemed to push against principles of classical style, such as abandoning deep, clean blacks for gray, low contrast images beset by electronic "noise," re-describing low resolution images as "poetic" or evocative, composing images without recourse to shallow focus or sharp color to guide the eye of the viewer, and accepting "ugly" highlights and edges, washed-out color palettes, and unflattering light on the faces of stars. In addition to rethinking these classical principles, cinematographers would have to take responsibility for designing (or collaborating on) new workflows based on video- or digital imaging. Often that task required a mingling of alternative formats with the medium of film. In some cases, film became the fall-back medium where video or video cameras could not achieve a desired effect. Mixing film with video created logistical challenges as well as a new problem of integrating the various media to achieve a consistent, unified style within the scope of any single project.

In this unstable environment, cinematographers' authority took several shapes. When master cinematographers like John Bailey took on the role of integrating and evaluating new production cameras in "traditional" production, they could wield

considerable authority, as in the case of *The Anniversary Party*, on which co-director and star Alan Cumming described Bailey and the project's editor Carol Littleton as "like having your mum and dad" on the set.[499] In projects like *Star Wars* and *Collateral*, though, the cinematographer was obliged to take on a much more collaborative role, clearly subordinate to the authority of other personnel such as the producer or director, special effects teams, colorists and technical consultants. On *Personal Velocity*, Ellen Kuras embraced the role of reluctant experimentalist as requested by her director, Rebecca Miller and the project's funder, InDigEnt Productions. In that role, she attempted to maintain certain aspects of classical style, designed a shooting plan and less classical "pictorial" visual style. Her ability to artfully merge the expressive and the conventional allowed others in the craft to describe her work as "abstract" or "poetic," yet still cinematography.

An analysis of the production culture of these four video- and digital-originated films suggests that while structures of authority were shifted slightly by new on-set practices and new role players such as colorists, approaches to style were not changed drastically by the new camera systems. Classical principles remained an important touchstone, as did the composition of camera crews assembled to achieve them. The most significant outcome of these forays into making movies with new media, new workflows, and revised structures of authority was the recognition that, in the future, any imaging device might become a "production camera." What was changing was the cinematographer's role as guardian of the image of the specifically *filmic* image; new role players (alongside cinematographers) would find themselves partly responsible for the images created by new machines. However, the practices of designing and safeguarding

[499] Quoted in Don Shewey "From co-stars turned co-directors, a marriage tale." New York Times. May 13, 2001, 24. Editor Carol Littleton is also John Bailey's wife, which must have added another layer of psychological complexity to the collaborative relationships on *The Anniversary Party*.

classically informed shots—grounded in matching mood to story, balancing conventions built around genre/scenes, figure lighting, effects lighting, composition, and color—would remain, as would the need to negotiate and struggle for a creative voice in that process. The ambivalence of John Bailey, the trials of Paul Cameron and Dion Beebe, and the invention of Ellen Kuras, seen against their "success" at demonstrating professional cinematography with non-professional tools, showed how the principal values and classical conventions of the cinematography could persist, although in a negotiated and sometimes re-imagined relationship to "film-look" as the apex of feature film cinematography.

Chapter 8: D-Cinema, the StEM, and the ASC Technology Committee.

In January 2001, Don Mead, co-chair of the Moving Pictures Experts Group (MPEG) committee on digital cinema, said "the motion picture industry is under-scienced. It hasn't changed much since Thomas Edison invented the talkies."[500] We might forgive an imperfect sense of film history among these electronics engineers, as they gathered to focus on the technological future of movies, not the technological past. That month, MPEG and the Society of Motion Picture and Television Engineers (SMPTE) were meeting, in a session organized by the National Institute for Standards and Technology, as part of an effort to coordinate diverging standards on digital motion imaging.[501] Despite Mead's gibe, the film industry was not lacking in "science," of course. The R&D efforts of service and technology providers such as Kodak, Technicolor, Dolby, Sony, and other firms were intensive and on-going. What Mead meant was that the industry's science was not focused on integrating motion pictures with an emerging, "converging," digitizing media world. Hollywood was part of an old paradigm. There was plenty of science in movies; it was just of the wrong sort.

In the early 2000s, "d-cinema" was emerging as a catch-all phrase for an interoperable *digital* system of mastering, distribution, and exhibition of feature length

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[500] Margaret Quan. "NIST Looks to Spur Work on Digital Cinema Standards." January 4, 2001. *EE Times*. <http://www.eetimes.com/electronics-news/4041529/NIST-looks-to-spur-work-on-digital-cinema-standards>, Accessed June 18, 2005.

[501] An industrial or engineering standard is a formal statement of criteria and requirements, typically created through processes of consensus or negotiation by panels of experts and intended to provide uniformity and coordinate industrial processes or markets. MPEG and SMPTE are standards-setting organizations. MPEG is a sub-group of the International Organization of Standardization, while SMPTE is a member group of the American National Standards Institute. NIST, formerly the National Bureau of Standards, is an agency of the Department of Commerce that facilitates the creation of industry standards to promote competiveness and economic development of US companies.

movies and other big-screen presentations.[502] As the digital intermediate and video- and digital-cameras came to dominate cinematographers' discussions of their craft in the late 1990s, this third transformative wave of change—digital distribution and projection—was emerging with remarkable speed, ushered in by manufacturers, engineers, technologists, standard-setting bodies, and Hollywood's major studios. The major studios, Paramount, Universal, 20th Century Fox, Disney, Warner Bros., Sony Pictures, and MGM (all of whom function as divisions of global media conglomerates), saw enormous cost-benefits in distributing digital, rather than physical, prints of movies around the globe. Though its significance to production practices appeared at first tangential, digital distribution was a cause for concern among cinematographers. Foremost among these fears was a possible end to, or degrading of, big screen presentation of cinema, as well as how de facto standards, established by a handful of incumbent firms, might lead to lesser quality in production cameras, image-making, and a loss of interoperability in handling motion imaging through the production process.

This chapter focuses on institutional and craft maneuvering and negotiations over d-cinema between 2002 and 2005 and how a studio consortium, Digital Cinema Initiatives, LLC (DCI), SMPTE, and the ASC's Technology Committee worked to establish a system of digital cinema that preserved existing institutional relationships and

[502] Mastering refers to the process of preparing the original, archivable "master" of a movie from which duplicates are struck, distribution refers to the process of duplicating the movie with appropriate quality control and transporting the movie to the point of exhibition with quality control and adequate security, and exhibition refers to the processes of preparation, distribution, projection, asset management, and record-keeping within the theater (or wherever the program will be displayed). Note that production—the process of creating and assembling the movie—was not part of d-cinema as the term was used by the relevant groups here, although the interface between production and exhibition was of concern to cinematographers. One consequence of digitalization has been the need for craft workers such as cinematographers to become concerned with processes up to and beyond mastering. See Charles Swartz, "Introduction," in *Understanding Digital Cinema*, edited by Charles Swartz (New York: Focal Press, 2005), 2-4.

craft definitions that had prevailed in the era of traditional production and distribution.[503] I consider this development as an act of inscribing, through the creation of technical documents, flow charts, and performances of craft ability, a body of new knowledge and practice the industry would come to call *digital cinema*.[504] I'm interested in the process by which the inscription practices of scientists, engineers, technicians, executives and craft workers were deployed to authorize a naturalized concept of a digital, rather than, film-based motion picture industry. More to the point of this project, I want to show how cinematographers adopted inscription practices in their efforts to retain authority in the process of digitalization.

Caldwell, following Latour, has suggested that film and video production tools operate as more than mere instrumental objects in at least three ways: first, by favoring certain uses and aesthetics over others; second, as participants in networks of "distributed cognition" of human and technical delegates within prescribed social and industrial relationships. Caldwell uses the example of a 35mm film camera to describe how a device operates in such a network of distributed, or situated, cognition, in which technical and human "lieutenants" are productive to the degree to which they perform, as a network, within prescribed relationships and functions.[505] "Delegation," a notion taken from Latour's actor-network theory, is relevant to my study as the shift from 35mm to digital imaging represented a crucial loss of one form of technological agency in the network of cinematographic authority. Finally, Caldwell describes production tools as

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[503] I will use "d-cinema," as these groups did, to refer to this particular deployment of digital cinema as an distribution and exhibition strategy. I will use the term "digital cinema" to refer to the more general transition to digital tools across the motion picture production process.

[504] Latour has described the culture of laboratory workers as one filled with the devices and practices of "inscription"—data logs, research journals, and publications—that facilitate the creation of "ideas," "theories," and "reasons" and authorize certain regimes of scientific fact-finding. In this way he draws attention to the material basis of scientific facts. See Bruno Latour and Steve Woolgar, *Laboratory Life: the Social Construction of Scientific Facts.* (Beverly Hills: Sage Publications, 1979), 69.

[505]

cultural performances, as particular tools connote different cultural codes that condition the relationships of the users, as handheld video, for example, connotes documentary-reality both to audiences but also conditions the mode of production and crew relationships. This conception of below-the-line labor, cultural performance, and "trade talk about tools" lays the groundwork for my portrayal of cinematographers, their relationship to production apparatus, and the need to adopt a more active stance in their definition, creation and use. As Caldwell states:

> Cycles of standards obsolescence create short term openings in which new corporate technology interests can enter the fray and promote alternatives. Ironically, having gained access, new participants seek further standardization in order to protect their proprietary interests and affiliations within the market.[506]

This chapter presents a case study of this drama of invention and obsolescence while also complicating the picture somewhat by exploring one craft culture's stake in standardization—its active but conflicted role in inscribing and performing d-cinema as a process of re-standardization.

In the case of d-cinema, SMPTE, the DCI, and ASC engaged in a kind of cascading hierarchy of intervention, as the SMPTE focused on underlying technological standards, the DCI labored on the DCI Specification, and the ASC created recommendations, proposals, and the Standard Evaluation Material, or StEM, a short narrative film designed to "stress-test" projectors with cinematographically challenging images. The creation of these standards, specifications, recommendations, and test films are the focus of much of this chapter.[507] A research unit affiliated with the University of Southern California, the Entertainment Technology Center (ETC), provided the test bed

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[506] Caldwell, *Production Culture*, 194

[507] These are imprecise categories, but a standard typically carries the most weight of these kinds of documents, being applicable across industries or areas of specialization and often bearing the imprint of national or international organization. A specification formalizes a standard by applying it to a particular product, process, or system. Recommendations, test methods, and best practices documents are written or created in reference to specifications or standards to operationalize or assist with compliance.

and helped synthesize findings through writings and reports, and the ETC's *Digital Cinema Laboratory* (DCL) was a key site for investing d-cinema with the imprimatur of institutional and technological validity.[508] As one of several locations where these groups could discuss the implications of digitalization (including trade shows, technical meetings, and festivals) the DCL was important for being perceived as a "neutral" location (in the sense that it was not explicitly within a sphere of influence of a single studio or manufacturer). Although these sites, performances, and forms of inscription held different degrees of authority and were meant for somewhat different audiences, the differences were more in degree than kind; all were focused on casting a working system of d-cinema. They drew on popular enthusiasm for digitalization and the rhetoric of democratization and access that often accompanied this discussion, but the definition of d-cinema that emerged was inextricable from the interests of conglomerate Hollywood, represented most directly by the DCI consortium.

After 2005 and the release of the DCI Specification, movie exhibition saw a remarkable transformation from an industry that screened movies using film projectors to an industry on its way to predominantly screening movies with digital projectors, including 3-D movies, live events, and other entertainment made possible by real-time transmission and projection of high resolution digital data.[509] This transition has not been cheap or easily negotiated but, as of mid-2011, approximately 20,000 out of 39,000

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[508] Other groups were working on aspects of d-cinema. Most significant of these was the National Association of Theater Owners (NATO), which coordinated with DCI and created a specification for d-cinema deployment at the exhibition level. NATO's contribution began with a recommendations document in December 2004 and then a "Digital Cinema Systems Requirement" specification in March 2006. However, NATO's (and other specifications) were all created with reference to the DCI specification. See David Hancock and Charlotte Jones. "D-Cinema Timeline." *Digital cinema: Rollout, Business Models and Forecasts to 2010*." Screen Digest Ltd. 2006. Highbeam Research.1 May 2011 <http://www.highbeam.com>, also Eric A. Taub, "Among Film's Ghosts, It's Future," *New York Times*, June 19, 2003, G2:1.

[509] John Fithian. "State of the Industry Keynote." Delivered at CinemaCon, Las Vegas, NV, March 29, 2011. < http://www.natoonline.org/pdfs/JF%20SPEECH%20CINEMACON%202011%20-%20Distribution%20Version.pdf> Accessed June 20, 2011.

movie screens (51%) in North America have converted to digital projection. The remainder are still screening 35mm prints. Of the digital screens, 9,000 are equipped for stereoscopic (3-D) projection, a system that relies on digital projection.[510] In March 2011, John Fithian, President of the National Association of Theater Owners (NATO), told a keynote audience at the CinemaCon trade show, "I believe film prints [of new studio releases] could be unavailable as early as the end of 2013."[511] Some judged this prediction to be premature, but it is certainly the case that as digital projection becomes more widespread, the cost of film prints will rise and create further incentive for theater owners to switch their projection systems. Movies printed and distributed on film will become a rarity in the years to come.

I will not attempt detailed descriptions of the technological particulars of d-cinema in this chapter. I'm not qualified to discuss many of the nuances and, in any case, my interests are less about the infrastructure of the industry than the role and responses of workers within it. These are difficult boundaries to maintain, because the negotiations (or lack of them) over certain technological standards is an important aspect of the story. D-cinema was an extraordinarily complex process of technological, economic, and industrial coordination that required planning and engineering a more-or-less parallel system of distribution and theatrical exhibition for motion pictures, with minimal disruption to the existing system. According to Schwarz, that over-building took in at least nine distinct areas of technical concern: color science, mastering and archiving, security and piracy, audio science, distribution and transport, image compression, projection, theater management procedures, and international technology integration.[512]

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[510] Ibid.
[511] Ibid.
[512] Charles S. Swartz, interview by the author, March 27, 2005, transcript. See also Swartz's *Understanding Digital Cinema*.

Each of those was in turn an area of specialization, with experts (scientists, technologists, programmers, or process specialists) and established industry groups and incumbent firms.

At one level the d-cinema transition illustrates the far-reaching ability of the media conglomerates' to use their oligopolistic position to coordinate and manage complex technological change in the field of motion pictures. However, I will describe this period less as a moment of large-scale industrial coordination than an alignment of interests and a series of accommodations and compromises by groups with different stakes in the process of digitalization. I begin with the work of SMPTE and DCI, but in the end turn back toward cinematographers, a group for whom the rewards of digitalization were a mixed bag at best. In the actions of the ASC Technology Committee, formed in late 2002 (not long after the releases of *Star Wars: Attack of the Clones* and *Personal Velocity*), we see the same tensions that I've traced in earlier chapters. For craft level workers these questions were not simple matters of progress, efficiency, or advancing the "art of cinema." They are questions of authority and the salience of craft knowledge. The ASC Technology Committee came to play a key mediating role in d-cinema through drafting technical primers and producing the StEM mini-movie as a benchmark for "quality" in the emerging infrastructure. In doing so cinematographers began rethinking the foundations of their craft knowledge in digital terms.

THE BEGINNINGS OF D-CINEMA

By the late 1990s, several companies were marketing high-output digital projectors, suitable for presenting video or computer-based presentations in large venues such as concerts, conventions, or pre-show announcements in movie theaters. In early 1999, Lucasfilm entered agreements with two digital projector manufacturers,

CineComm Digital Cinema and Texas Instruments, to showcase their high-lumen projectors on four screens at the opening of *Star Wars: The Phantom Menace* that summer. The June "shootout" included press screenings with side-by-side comparisons of film and digital projection and generated a great deal of press coverage.[513] *Variety*'s Todd McCarthy viewed screenings with both projectors and, although he was dismayed by the CineComm screening, complaining of murky dark areas, flat colors, and "pixilation," he was impressed with the "sharp, bright, and pleasing" images from the Texas Instruments device. Still, the success of Lucas' public relations gambit worried him:

> Perhaps this is, indeed, the way "films" will commonly be seen in a few years' time, when digital projection is sufficiently perfected to make celluloid with sprocket holes and gear driven projectors go the way of vinyl and turntables. But the way in which the industry and the public are already and early swallowing this major change as a fait accompli, without even the slightest questioning of its many implications is troubling; it's as if it must be good if George Lucas and the financial interests behind the technology tell us it is.[514]

AC reported that audiences had "witnessed a revolution…watching a movie without film," but also noted that the screening was little more than a stunt given the herculean effort required to transfer the movie—which had been finished on film—into digital form, then transferred to high-definition video tape for the screening.[515] The lack of a standardized, sustainable workflow made the *Phantom Menace* screening seem like more of Lucas's premature public relations grandstanding for digital technology. However, unlike Lucas's needling give-and-take with the crafts over digital origination in recent years, the screenings successfully focused the attention of the studios on the cost-benefits of digital projection. In fact, a major re-alignment was already beginning in Hollywood.

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513 See Marc Glaser. "Digital 'Menace' unveiled." *Daily Variety*. June 18, 1999. Todd McCarthy. "Deep Focus." *Variety* June 28, 1999. 7, Tim Avis. "Digital Revolution?" *Variety*, June 21, 1999. "Phantom Menace first" (press release) < http://www.starwars.com/episode-i/release/theater/news19990312.html> March 12, 1999.

514 McCarthy, "Deep Focus."

515 "New Paths for Light." *American Cinematographer.* (September 1999).

That same summer, Technicolor, a major post-production service provider, acquired a large stake in Real Image Technology, a start-up developer of digital cinema delivery systems.[516] The following spring, Texas Instruments announced partnerships with Disney and IMAX to install and field test "electronic theaters" around the country.[517] Digital projection tests, termed, confusingly, d-cinema, e-cinema, or digital cinema in different regions and sub-industries, were taking place with increasing frequency around the world.[518] Rob Hummel, a prominent cinema-technology engineer, editor of the ASC *Cinematographer's Manual*, and Vice-President at Technicolor, warned that the lack of an integrated, standardized system for movie distribution could lead to disaster: "In Hollywood, the only thing that is going to fly is an open system. You don't want to get into a situation where you have to make five different versions of your film for five different systems."[519]

The physical shape of film (a perforated acetate strip) along with the "academy ratio" frame shape (four perforations per frame and a 1.37:1 aspect ratio) had provided that open standard for decades. It was established by the SMPE (precursor to the SMPTE) and Academy of Motion Picture Arts and Sciences (AMPAS) in the early 1930s and served through the mid-1950s. That standard resolved what had been growing confusion around sound-on-film technologies, but was still based on the physical design of perforated film dating back to the days of Edison. In the mid-century, widescreen aspect ratios, anamorphic lenses, and larger format films added to the range of available frame shapes, but 35mm film remained the primary medium of the industry over the

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516 See Barbara Murphy, "Technicolor to offer Digital Delivery of Movies." *Los Angeles Times* August 17, 1999.and "Technicolor Prepares for Digital Future." *Variety*. August 6, 1999.
517"IMAX, TI agree on digital projection" *The Hollywood Reporter*. June 6, 2000
518 David Hancock and Charlotte Jones. "12 D-Cinema Timeline." *Digital cinema: Rollout, Business Models and Forecasts to 2010*." Screen Digest Ltd. 2006. Highbeam Research.1 May 2011 <http://www.highbeam.com>.
519 "Technicolor Prepares for Digital Future." *Variety*. August 6, 1999.

decades. So-called "four-perf 35" provided an open standard (i.e., royalty-free) that linked the chain from production to distribution, as well as film and camera manufacturers, laboratory service providers, projector manufacturers and exhibitors. Electronic or digital projection threatened the four-perf 35 standard as a linking mechanism that tied dozens of manufacturers, studios, and craft workers in a relatively small network of cinema technology users and providers. What Hummel, and many others, began to call for was an electronic equivalent to four-perf 35; a way to ensure interoperability across vendors and users. In a medium as radically malleable and mobile as digital cinema, though, the puzzle would not be solved so simply as designating standard-sized sprocket holes and frame shapes.

In late 1999, SMPTE formed a new working group, the DC28 Technology Committee for Digital Cinema (usually referred to as the DC28), to begin discussions of an open standard to effectively replace four-perf 35, to ensure, as *Variety* put it, "that engineering decisions aren't cut as back room deals that overlook the aesthetic and technical needs of filmmakers."[520] The DC28 held its first open meeting in January of 2000 and the 142nd SMPTE Technical Conference and Exhibition in October 2000 was dominated by discussions of digital cinema.[521] To a great extent, the transition to d-cinema began in earnest at this point, as the DC28 quickly grew to include 125 engineers and technology executives with a charter to discuss the full range of issues around standardizing digital cinema. There were many complicating factors in this charter, not the least of which would be shepherding a still-nascent infrastructure, digital cinema,

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[520] "Tech Talk: 142nd SMPTE Technical Conference and Exhibition." *Variety* November 2000

[521] See Quan, *EE Times*, January 4, 2001 for the statement on the stated goals of the DC28. Image compression would be one of the thorniest issues of this agenda. Compression was used to facilitate storage or transmission, but it degraded image quality by reducing resolution and color rendition. Although compression was common practice in manufacturing DVDs and in broadcasting, cable and satellite distribution, filmmakers and studios were especially concerned to avoid compression in production processes or big screen exhibition.

while avoiding the confusion and halting progress that were still plaguing the roll-out of digital television at that time. A second challenge was to engineer this system based on existing technology: cinema exhibition is a limited market (roughly 36,000 screens in the U.S. in 2000, 39,000 screens in 2011 including d-cinema screens.) and technology vendors sold relatively few units to cinemas. Moreover, projectors and other theatrical systems are expected to last well over a decade, a relatively slow rate of obsolescence in the high technology sector. Without a mass market to serve, no major R&D provider would be conducting basic research or inventing new high-technology solutions for digital cinema.[522] Within these limits the DC28 set out to create a standard that produced a projected image equivalent to film (if not better), provided an open standard for vendors, protected content from piracy and theft, and required little to no digital compression of the image.[523] *AC* published an extensive feature on the proceedings in January, favorably repeating a phrase from the DC28's report that the quality of digital cinema prints should "meet or exceed the quality of an answer print."[524]

These outcomes from the DC28's initial report were good news to cinematographers. Implicit, at least, was the idea that "film-look" would continue to be the benchmark for d-cinema. If this standard could be maintained, digital cinema promised to improve the big screen experience by ridding it of four-perf 35mm's problems as a display technology; it was, despite its superior color, warmth, and resolution, also a fragile medium that started to degrade in the course of just a few runs through the mechanical projector. Scratches, dust, and tears quickly scar film prints in the course of two or three daily showings. If digital cinema could ensure answer print quality

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[522] Michael Karagosian. "SMPTE's Digital Cinema Committee Takes off Running." (MKPE Consulting, 2000) <http://www.mkpe.com/publications/d-cinema/misc/dc28_takes_off.php>, Accessed June 20, 2011.
[523] Ibid.
[524] Debra Kaufman, "The Post Process: SMPTE Examines Digital Cinema and Advanced TV." *American Cinematographer*. January 2001. 10.

in each and every screening, the art of cinematography would be more visible, more protected. This was a high bar, though, and a costly one. At the conference, Curt Behlmer, chairman of the DC28 and post-production engineer for Warner Bros. was asked, "Who is going to pay for this?" He replied, "It's not our problem."[525]

Between 2000 and 2002, SMPTE, MPEG, and other stakeholders tried to coordinate their efforts, conduct research on the central issues facing digital exhibition, and promote realistic expectations. In 2001, a group of the major film studios—Disney, Warner Bros., Sony, Paramount, Universal and Twentieth Century Fox—quietly began negotiations to accelerate the conversion by forming a joint non-profit called Newco to lease d-cinema equipment to exhibitors.[526] After the plans were revealed, Newco fell apart over anti-trust concerns, resistance from exhibitors, and disagreements among the studios over standards of quality and interoperability. Michael Karagosian, a member of DC28 and prominent consultant for the digital transition, wrote,

> DC28 has been criticized for not quickly creating standards. But let's remember that for store-and-forward, which is the particular area that DC28 has been focused on, we wish to replace a working 100-year old technology with a digital version that, with luck, will offer another 100 years of functionality.[527]

George Lucas had been impressed with the *Phantom Menace* digital screening in 1999 and announced his intention to release *Attack of the Clones* only to digital theaters.[528] However, as the 2002 release date approached there were, according to Texas

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[525] Ibid.

[526] See Carl DiOrio. "Digital Screen Plan Afoot." *Variety*. May 21, 2001. 6, also Michael Karagosian. "Newco Digital Cinema: Tech Issues Come Home to Roost." *In Focus*. June 2002. <http:www.infocusmag.com> Accessed February 18, 2004. and the David Hancockand Charlotte Jones report *Digital cinema: Rollout, Business Models and Forecasts to 2010*.

[527] There were two models considered for d-cinema, "streaming," in which programs would be sent by narrowcast transmission to theaters, and "store-and-forward," which more closely resembled the traditional model of delivering the program on a physical medium (for d-cinema, on disc or hard drive) to theaters for exhibition. See Michael Karagosian's remarks to European Digital Cinema Forum, December 5, 2001. Reprinted in "The American View, Part II." *Digital Cinema*. March 2002.

[528] Benjamin Errett. "Digital Film: Cheaper, Faster, but is it better?" *National Post* (Canada). May 17, 2002, PM4.

Instruments, only 70 installed screens in North America, 25 in Asia, 18 in Europe, and 3 in Latin America. Lucas was planning a 5000 screen worldwide opening; *Attack of the Clones* would be exhibited on 35mm after all.[529] The transition to digital projection may have been slowed by the confusion over standards, but the downturn in the theatrical business was of more relevance. With several national chains filing for bankruptcy the industry was widely perceived to have a glut of screens for the available audience.[530] Large investments in physical plant were not in exhibitors' plans. The simple fact was, although studios and distributors stood to gain considerably from d-cinema, exhibitors were satisfied with their projection technology as it was.

DIGITAL CINEMA INITIATIVES, LLC

By 2002, then, there was the perception of a stalled transition and growing crisis over the lack of a common standard. The technological elements for a d-cinema system such as servers, projectors, and security apparatus had been developed. Manufacturers were testing a variety of working prototype systems. Exhibitors were resistant, but competitive pressures were building in the studios. There were no shared operational practices to link d-cinema into a coherent system. In October 2002, Ioan Allen, a member of the DC28 and a Vice President at Dolby Laboratories, acknowledged there were issues that the DC28 could not resolve alone; to some extent they were waiting for the studios. He explained that while in some standards discussions the SMPTE committee had the "more forceful experts" and could choose and enforce a standard, in other cases, the key experts were outside the committee and SMPTE would react to what the industry seemed to be choosing.[531] D-cinema was apparently the latter case. A single movie title such as

[529] See Marlene Edmunds. "Clones Provides Lift but Digital Still Lags." *Daily Variety*. June 27, 2002. Also, Hancock and Jones Report, 2006.
[530] Harlan Levy. "Tons of Screens, Not enough Viewers." *New York Times*. March 11, 2001 and Rick Lyman. "A Partly Cloudy Forecast for Theater Owners." *New York Times*. March 12, 2001.
[531] "Working Kinks out of d-cinema." *The Hollywood Reporter*. October 11, 2002.

Star Wars, he said, was not enough to trigger the transition: "It's the procession of software (i.e., movies) that will be the trigger."[532] But while software (and hardware) seemed to be proceeding, SMPTE seemed hung on its inability to effectively coordinate the competitive dynamics of the industry as a whole—from production to distribution to exhibition.

In the spring of 2002 the major studios tried again. This time the same group—Disney, Fox, Paramount, Sony Pictures, Universal, and Warner Bros. (MGM had been among the original group, but dropped out in May 2005)—created a joint venture called Digital Cinema Initiative, LLC (DCI) to "craft a uniform set of d-cinema engineering standards."[533] Chuck Goldwater, a former chairman of NATO and executive from the theatrical side of the industry was appointed as CEO, and Walt Ordway, a former vice-president at Hughes Electronics DirecTV division was appointed Chief Technology Officer.[534] Rather than market or sell digital cinema equipment as Newco had proposed, DCI's purpose was to "establish and document voluntary specifications for an open architecture for digital cinema that ensures a uniform and high level of technical performance, reliability, and quality control."[535] SMPTE would continue to work toward the technical standards that manufacturers needed, but DCI's specification would serve as a template for those standards, defining the structure of digital files delivered to theaters and establishing minimum objective values in areas such as resolution, encryption, and compression, as well as security procedures, transport methods, projector calibration,

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[532] Ibid.

[533] See Carl DiOrio "Digital Pix Panel Sharpens Focus." *Daily Variety*. May 22, 2002. The new venture was temporarily titled Newco Digital Cinema, just like the early group, but shifted to Digital Cinema Initiatives later that year. Amy Harmon "Using a Hard Drive to Show Films in Theaters," *New York Times*. November 14, 2002, and Eric Taub. "Digital Projection is coming to Films, now, who pays?" *New York Times*. October 13, 2003.

[534] Carl DiOrio. "New Chief Takes Digital Org's Reins." *Daily Variety*. July 25, 2002. 9. Other leadership positions in DCI were shared by the studios. Each year, one studio was assigned to provide technology leadership while another provided management leadership with terms of service ending each September.

[535] From the DCI, LLC website <http://www.dcimovies.com> Accessed June 15, 2011.

"playlists" control, and the like.[536] DCI also planned to create compliance and testing services for new d-cinema technologies, essentially a certification program without the formality of a certificate. Words like *voluntary* and *specification* were crucial here; they distanced DCI from a role as standard-setting or enforcer. The studios' collective agreement to abide by "DCI compliance" in their dealings, though, gave considerable force to the technical parameters established in the DCI specification.

At the end of 2002, DCI announced a partnership with the Entertainment Technology Center (ETC) to serve as the test bed for digital cinema technologies. The ETC was founded in 1993 as research unit to investigate new technologies in entertainment, with major funding from the seven major studios and Lucasfilm. In 1999, the Center began hosting the Digital Cinema Forum, from which came the idea of creating a "neutral" laboratory environment for testing new products. A screening facility, the "Digital Cinema Laboratory," (DCL) was established at the Hollywood Pacific Theater in Hollywood, funded in part by NATO and the MPAA. The DCL opened in October 2000, serving as a hub for demonstrations, panel discussions, and screenings in the old theater, a faded movie palace with a 50-foot screen and a Historic-Cultural Monument designation by the City of Los Angeles.[537] As Charles Schwarz described to me, the ETC's involvement was almost a foregone conclusion:

> When DCI was formed, I went to DCI and proposed that we be their provider of facilities and services so that they would come and do all the testing. They agreed, we made a contract to do that, and then we folded our own testing goals into the DCI testing goals. Because, understand, that seven studios who are DCI are also sponsors of the lab. It was through their effort and financial contribution that the

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[536] The DCI specification is a 150 page document with an enormous amount of technical detail. The first iteration was released on July 27, 2005. A revised and updated version was released on March 7, 2008. This is only a gloss on the intentions of the specification. The full document is available for download from the DCI website. <http://www.dcimovies.com/specification/index.com>

[537] The DCL was first described to me in interviews with Curtis Clark and Charles Swartz. Also described in Swartz, *Understanding Digital Cinema*, p10 and Rick Lyman. "The Digital Future is Knocking, when will Films let it in?" *New York Times*. March 11, 2000. B7. The DCL relocated to the USC campus in 2006.

> lab had been built in the beginning. So it was destiny, you might say, for the lab to be the birthplace of digital cinema.[538]

The work of the ETC goes beyond digital cinema, but when DCI was formed in 2002 it was ideally situated to host the industry's meetings, screenings, demonstrations, and debates over the new system.

THE ASC TECHNOLOGY COMMITTEE

By 2002, cinematographers had been grappling with the implications of digital cinema for several years, primarily in terms of on-set operations, new types of production cameras, and post-production. Successful films such as the *Lord of the Rings* trilogy (2001, 2002, 2003), *Panic Room* (2002), and *Stuart Little 2* (2002) were applying DI and digital mastering techniques. *Star Wars: Attack of the Clones* (2002) and *Personal Velocity* (2002) and other video- and digitally-shot films from that year, such as Steven Soderbergh's *Full Frontal*, Robert Rodriguez' *Spy Kids 2*, and a surprise hit from the U.K., *28 Days Later*, were stirring up public and industry interest in digital cinema. *28 Days Later* was a post-apocalyptic zombie movie directed by British filmmaker Danny Boyle and photographed on the pro-sumer grade Canon XL-1 by Anthony Dod Mantle, a cinematographer best known for his work with the Dogme collective. Also in 2002, the French electronics conglomerate Thomson introduced the Viper Filmstream, the first digital movie camera that recorded directly to disk, bypassing videotape and the need to compress its data to a video signal. (The Viper was first used in production on *Collateral*, a 2004 release.)

In January 2002, Steven Poster, ASC, was elected president of the ASC. He succeeded Victor Kemper, ASC, who had held the office from 1993-1996 and again

[538] Charles S. Swartz, interview by the author, March 27, 2005, transcript.

1999-2001 (the longest serving president in the organization's history).[539] Poster was an experienced cinematographer with credits going back to *Close Encounters of the Third Kind* (1977) as a camera operator, and had a varied career as a cinematographer in film and television. In 1997 he had written a skeptical if somewhat prescient editorial in *AC* titled "The Phoenix Flies Again, or the Death of Film (and other Folk Tales)" warning that electronic acquisition and projection could catch up to film, unless film kept improving and reducing costs.[540] By the time he was elected President of the ASC, Poster's folk tale was looking more like reality and one of his top priorities was finding a place for cinematographers in the new digital regimes overtaking the craft. Technological change was the theme of Poster's election announcement in the *AC,* in which he said:

> One of our members said something to me that struck me as being very poignant. He said, 'Our position is to protect the integrity of the image. The ASC is not a reactionary organization. We embrace new technologies, but not at the expense of quality.'…Now that things can be so radically changed with digital tools, it's very important for us to be involved in post in order to tell the story as it was originally intended.[541]

Poster was not denying the potential of the technology nor surrendering ground. Rather, he urged cinematographers to expand their domain of authority. Similarly, in *Daily Variety*, Poster sought to dispel the idea that the ASC was opposed to digital cinema. "We've always been the early adopters," he said, and continued:

> We have no agenda other than to safeguard the quality of the image. We don't see it as a fight. When you see the work that Alan Daviau and John Bailey have done

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[539] Kemper is an interesting figure. Part of an older generation than Steven Poster, he starting his career in early television in the 1940s as a videographer and specialist in television studio production. He broke into cinematography in the late 1960s on east coast independent productions, such as Cassavettes' *Husbands* (1970), before moving to Los Angeles. Some of his best-known work was done in the east, though, on films such as *Dog Day Afternoon* (1975) and *Slapshot* (1977). See Bob Fisher. "A Fitting Candidate for Kudos." *American Cinematographer* 79:2 (February 1998). p 30.

[540] Steven Poster, "Filmmakers Forum: The Phoenix Rides Again, or the Death of Film (and other Folks Tales). *American Cinematographer* 78:4 (April 1997), p 128.

[541] "From the Clubhouse: Steven Poster elected President." *American Cinematographer* 83:3 March 2002 188.

> with alternative capture technologies, you realize that a master cinematographer can use any medium and make it work brilliantly.[542]

In November 2002, Poster approached Curtis Clark and asked him to reinvigorate the ASC's technology committee as a means to engage the industry discussions around digital cinema.[543]

Curtis Clark was another experienced cinematographer and technologist. In the late 1990s he had given up cinematography to form a start-up company that used satellite communications to deliver "digital dailies" to film productions on location far from film laboratories.[544] Given the rise in "runaway" production (i.e., films shot outside Los Angeles) in contemporary film and television, Clark's concept seemed sound. Nonetheless, the company folded after a few years and Clark returned to cinematography. After Poster asked him to chair the technology committee, Clark drafted a mission statement in late 2002 that reads like a manifesto for a new, savvier, more aggressive craft stance toward digital cinematography:

> Some of the most pressing issues that the committee needs to address include an array of digital technologies that have been and are being progressively introduced into the motion picture imaging workflow. We understand how they impact cinematography and the role of cinematographers. Without that knowledge, we will become increasingly vulnerable to certain industry trends that could marginalize our creative contributions that have been the cornerstone of filmmaking since its inception. Whether we shoot theatrical features, cable or network broadcast movies or episodic series, these issues affect us all.[545]

Clark went on to list six areas of technological change that cinematographers needed to understand: HD cameras, visual effects, the DI, digital source mastering, d-cinema, and

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[542] Ellen Wolf. "ASC's Poster Child for the New Vanguard." *Daily Variety*. February 15, 2002. A3.
[543] Curtis Clark, interview by the author, July 25, 2005, transcript.
[544] Ibid., also described in Stephanie Argy, "Cinematography's Computer Age." *American Cinematographer*. 80: 8 (August 1999). 75, Debra Kaufman, "Industry Networking hits new Peak with NeTune's Showrunner." *American Cinematographer* 81:11 (November 2000) 101 and Sarah Woodward. "Curtis Clark ASC Unveils NeTune and Showrunner." *Shoot* 41:34 (25 August 2000), 7.
[545] ASC Technology Committee Mission Statement (provided by Curtis Clark); also published on ASC website <http://www.asctech.org/mission/index.htm> Accessed June 23, 2011.

image compression. He continued, "These digital image technologies can pose a threat and an opportunity. It is critical that we are able to discern the differences in this era of radical technology transition."[546] He stated that the group's goals would be to reach out to relevant industry groups, especially standard-setting bodies, educate the membership and public about technology issues and the role of cinematographers, and support film schools' education of cinematography students. Clark assembled a group of fifty cinematographers and technology leaders from the industry and the group formed five initial sub-committees: camera, DI, d-cinema, preservation, and advanced imaging.[547]

Clark said there was not a single event that led to the creation of the Technology Committee, but:

> …it was a general sense that things were beginning to change. Not even being aware of how rapidly they would…the DI issue was beginning to emerge as well. In fact, the mission statement that I wrote pretty much identifies the issues we are concerned about. I simply wrote a mission statement identifying the issues we needed to address. That was our thinking as of November 2002.[548]

The mission statement of the ASC technology committee illustrates several important shifts taking place within this craft culture. They were no sudden breaks, to be sure, nor did they reflect the prevailing sensibilities of all, or even most, cinematographers in 2002. Nonetheless, when Poster, Clark, and the fifty members of the technology committee accepted this mission statement, they revealed a new level of acceptance of the digital toolset and the "narrative of inevitability" that many important voices within the craft culture had resisted for the previous five years. More significant, I think, was a new, expansive concept of cinematography implied in Clark's list of techniques and technologies: post-production processes, computer-generated imagery, digital compression, and an explicit interest in exhibition or d-cinema. This was not a conception

[546] Ibid.
[547] Ibid.
[548] Ibid.

of cinematography that was focused on the past: on film, film cameras, and film laboratories.[549]

The committee's roster also revealed that shift, as the ASC broadened its category of membership to allow "associate members" that included engineers, technologists, and colorists (i.e., non-cinematographers), invited to sit on the technology committee. In fact, two of the group's sub-committees—the d-cinema and advanced imaging teams—were headed by associate members. Clark described that shift as key to the influence of the group:

> It was quite a radical departure for the ASC, the first time that they had a committee structure which allowed non-members to be members of a committee. We broadened the membership of the group, which was one of the most important decisions taken because we could not, would not have, if we limited it to ASC members and existing associate members, our knowledge base and talent pool that we drew on would not be as expansive as it is. Most of the ASC's activities historically have been related to traditional film-based production and most of our associates are in that area. We don't have—we didn't have—an abundance of associate members in the technology area who were out of the digital literati, the cognoscenti, whatever.[550]

Digital lay outside the craft practice of cinematography and it had to be invited to the table. The ASC was starting to look more like a standard-setting body.[551]

Finally, embedded within Clark's descriptions of digital cinema was a shift toward the new concept of "look management," either in specific calls for tools of color management and tonal consistency, or in the need to measure and quantify data about image information as it passed from camera, through DI, to source mastering, and

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[549] The mission statement did dedicate a paragraph to the continued significance of film cameras and emulsions, cinema lenses, and film projection, but concluded that paragraph with a call to understand how film would work in the "radical world of hybrid motion imaging."

[550] Curtis Clark, interview by the author, July 22, 2005, transcript.

[551] See Jay Holben, "Best and Brightest." *American Cinemtographer*. 88:5 (May 2007) 64. The ASC Technology Committee included several members that also sat on the Academy of Motion Picture Arts and Sciences (AMPAS) Science and Technology Council. The Sci-Tech Council had a relatively low profile in the early stages of d-cinema, surprisingly so considering their historical role as a promoter of technological innovation and change. However, arguably, because the ASC moved first to create a Technology Committee, it emerged as a more influential body at this stage.

different exhibition and display formats (theatrical, DVD, Blu-ray, broadcast, etc.). When Clark described the new imperative to control the digital production process, it was often with a mix of skepticism and enthusiasm:

> There's that extraordinary promise that digital offers, both in digital capture and digital intermediate processes, through to the final, there are an equal number threats that would sabotage the best intents and vision, and find it thoroughly compromised, or compromised in one way or the other, never being able to realize what that potential is. That's why you always associated it with a fear factor that has to do with the amount of uncertainty—so we focused on creative intent, being able to capture that creative intent, protect the integrity of that creative intent, having the tools to massage that creative intent and expand on it where appropriate.[552]

In the years to come, the ASC's educational articles and technological primers would often focus on the importance of "creative intent." As with the digital intermediate and digital cameras, the malleability of the image arises as a crisis for craft. The ability to make a decision "stick" or "bake in" one's craft contribution becomes a focus of the response to new technologies. Clark described his decision to accept Poster's invitation to lead the Technology Committee as coming from a defensive posture:

> I knew a fair amount, at least, of the fundamentals of the technology. I'm drawn to it, whether I like it or not, actually I don't like it. There are aspects of technology I actually can't stand, but it worries me deeply. I guess it's because it worries me that I get involved, largely it's a defensive action. Know your enemy, so it's your friend not your enemy. Transform it, I guess. So I jumped back in, refocused purely on imaging issues and putting together a group of people for the technology committee who were especially committed and passionate to push the boulder up the hill, which is really what we're doing.[553]

Increasingly, Clark and his colleagues would turn to the language and techniques of management as a solution to this conundrum. "Look management," or the ability to encode and track qualities of the image such as framing, resolution, color, and so on, provided a technical, procedural definition of creative intent and a provisional, if

[552] Curtis Clark, interview by the author, July 22, 2005, transcript.
[553] Ibid.

imperfect, replacement for the barriers that four-perf 35 had presented to image manipulation in the post-production process.

In its first year, the ASC Technology Committee launched several initiatives that served both the industry's need for interoperability and cinematographers' desire to preserve their contribution as craft workers through look management. As Clark said,

> One of the things we needed to address early on was how the different components of the workflow were going to be integrated into a new type of workflow that we can embrace as approaching an industry standard, that is, open architecture, so that if I start in one facility and I have to change to another one or work with multiple facilities, I'm not at a huge handicap. If there are proprietary solutions that a facility uses—in the way they massage and process the data—and then I take that data and migrate it over to another facility and find that I don't know how to read it, it doesn't look the same, it doesn't perform the same, so you have to start over. You panic, do remedial work, compound the problem, put fix upon fix, before you know it you've experienced a significant deterioration and immense frustration and unhappiness and anger.[554]

There's a sense in this response how a cinematographer would be called upon more and more to shepherd projects from point-to-point in a newly fractured production process with unfamiliar service providers and new collaborators, but also a palpable sense of the fragility of reputation, craft, and productivity, how quickly that process can spin out of a cinematographer's control.

Without dwelling too much on the significance of a single document like the mission statement or Clark's explanations, I think these statements signal that the discourse within cinematography was shifting away from a preoccupation with the *independence* of craft—cinematography as a culture apart—to a discourse of *partnership and facilitation* of industry goals—of actively managing the digital transition in line with the studios' intentions. The craft ideal was not abandoned, and it can certainly be argued (and I would) that cinematography successfully protected many of its prerogatives as a

[554] Ibid.

craft, and that as an expressive form, or an art, there were gains in shift toward digital tools. Still, in this defensive response, by turning toward closer integration with other craft areas, service providers, and those constructing the software and hardware that would form the new infrastructure for digital cinema, cinematography inevitably became more embedded in a production process that was becoming more complex, more collaborative, and more difficult to make claims of authority, autonomy, or artfulness than it had been heretofore. This story reminds us that craft knowledge is founded on and articulated to historically contingent industrial formations (cinematography needed motion pictures and television), but those industrial formations may prove less than dependent on structures of craft knowledge (motion pictures may not require "cinematography" as cinematographers understood the term).

When the Technology Committee was profiled in *Variety* in May 2003, Clark said, "We will cut through the marketing hype about emerging technologies and make informed recommendations that serve both the art of filmmaking and the public interest."[555] The rhetorical gesture toward the public interest illustrates how some cinematographers adopted a position as a protector of the audience and professed concern for a future without their craft contribution:

> And you know that I guess the sad part is that we don't believe in our film culture and film tradition. And my 16-year-old son, his generation more associated with video games, with X-box, with PlayStation, those kind of things, where the delineation or difference between the movie and video game become less well defined, as indeed we are seeing.[556]

Robert Primes struck a similar note, linking the expressive, aesthetic work of cinematographers with cultural citizenship:

> The core of what we do is move emotions, tell stories, touch people, reflect contemporary values, enlighten, preach…all to entertain. And the art of doing that

[555] Dave McNary. "New Focus on Digital." *Daily Variety*. May 28, 2003, 8.
[556] Curtis Clark, interview by the author, July 25, 2005, transcript.

> is the art of working the mind, of creating beauty that touches people especially in a jaded society that moves along quickly and people do not always stop and, "Look at that, roses!" How do you arrest that person. I mean arrest them in such a way that they say, oh my God isn't this beautiful or whatever. Touch them or change their thinking on a fundamental level so that they can be better citizens?[557]

Richard Crudo was more pointed in his criticism of a culture that would abandon film:

> It's the instant gratification mentality that is destroying this society to a great extent. Seriously, I have a theory about it. When you look at the whole society versus where it was fifty years ago—look, we weren't alive—who knows how it was. But there's no question I think, in anybody's minds that the quality of the people and the quality of life and standards was way above what we are living in now. Everything is broken down to a certain extent. Why shouldn't this go with it? It is not surprising. There is always a guard who is trying to maintain a certain standard regardless of what is happening and its worth being trusted with that role.[558]

This is a form of nostalgia, of course, concentrated by the cultural power of movies, one craft's historical role within that, and a successful man's look back at halcyon days. The perception of a "broken down" culture and a sense for the importance of "standard-bearers" could not be more plainly stated. To cinematographers, digital tools seemed to emphasize all that film-craft was not: speed, flash, and needless complications. It overpromised and under-delivered. Even worse, there was a feeling for how contemporary movies seemed to be less culturally relevant:

> I think one of the interesting periods was the 1970s when there was that brief period when Hollywood was in such political disarray that they allowed all sorts of politically adventurous movies to be made in this town. Which now wouldn't have a cat's chance in hell of being made—about the war in Iraq or anything like that. Certainly regarding Vietnam, its aftermath, the consequences of it, dealing with it, Hollywood was in effect right in the forefront with *The Deer Hunter*, *Apocalypse Now*, these were films that did not pull their punches and they allowed filmmakers to do that.[559]

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[557] Robert Primes, interview by the author, August 23, 2005, transcript.
[558] Richard Crudo, interview by the author, August 26, 2005, transcript.
[559] Curtis Clark, interview by the author, July 25, 2005, transcript.

It would be easy to dismiss personal statements like these as deeply felt nostalgia and the privilege of a professional class. I think that is certainly the case to some extent. To be sure, the valorization of the past and past practitioners is an ingrained aspect of craft culture. What I want to underscore is the depth of this craft culture's investment in cultural value, a sense of responsibility—self-interested as it may be—for the work of cultural continuity and maintenance of social values—it is (or was) the work of movies and it was their work. To me, it is remarkable when any kind of labor takes its work so seriously—or purports to—and finds such high purpose in its practices and routines. One might expect a discourse like this in the practice of law or medicine, and although I'm sure many cinematographers would scoff as these sorts of expressions of significance in their daily work on advertisements, television programs, and the ephemera of popular culture, these cinematographers, put in a position of defending their craft, really do not hesitate to place themselves in the very foundations of cultural identity. Their response to the perils of malleability and changing workflows, of declining image quality and jumbled lines of authority is articulated to these very powerful structures of cultural value: And yet, they also lived in this contradiction: translating and facilitating a d-cinema transformation could marginalize or weaken their claims to cultural relevance as a craft.

THE ACTIONS OF THE TECHNOLOGY COMMITTEE

The Technology Committee took several steps to intervene in the creation of standards for digital cinema and how cinematographers should respond to new affordances in the digital workflows. Some of the interventions were rhetorical; others were based on the inscription and translation of their craft practice into digital terms. As subcommittees investigated their particular areas, *AC* publishing lengthy updates on their progress, such as "Metadata's Impact on Artistic Intent," which reviewed proposals for

encoding information about an image's authorship and its visual characteristics into the image data on a frame-by-frame basis.[560] Metadata is a coding technique in which any changes could then be traced and accounted for as images moved through the production pipeline. The article describes metadata as a new term for an old concept, simply an update of cinematographers' familiar practices of keeping a production diary, making margin notes in their copy of the shooting script, or attaching post-it notes to reels of films for processing. Significantly, metadata was not simply an ad hoc technique to direct or instruct technicians; rather, it was a technology of accountability. It ensured that the designed look, or creative intent, of the cinematographer was built into the footage he or she created and, if not, how it had been changed.

In April 2004, the co-chair of the ASC's DI subcommittee, colorist Lou Levinson, was interviewed in an *AC* article, "Tomorrow's Technology: Exploring the Digital Intermediate."[561] A few months later this report was expanded with the publication of an enormous, collectively written two-part primer, titled "The Color-Space Conundrum," exploring color science, human visual response to color, the cultural associations of color to mood, the history of color on TV and film, lighting for color, who was responsible for color in the motion picture division of labor, and how the digital intermediate related to these areas.[562] The article introduced Clark's "best practices" diagram of a hybrid imaging workflow (See Figure 46) and a proposal for a "Color Decision List" (CDL). The CDL was an initial idea for putting "look management" into practice, based on the metaphor of the "Edit Decision List" that guides the conforming of a film negative to an

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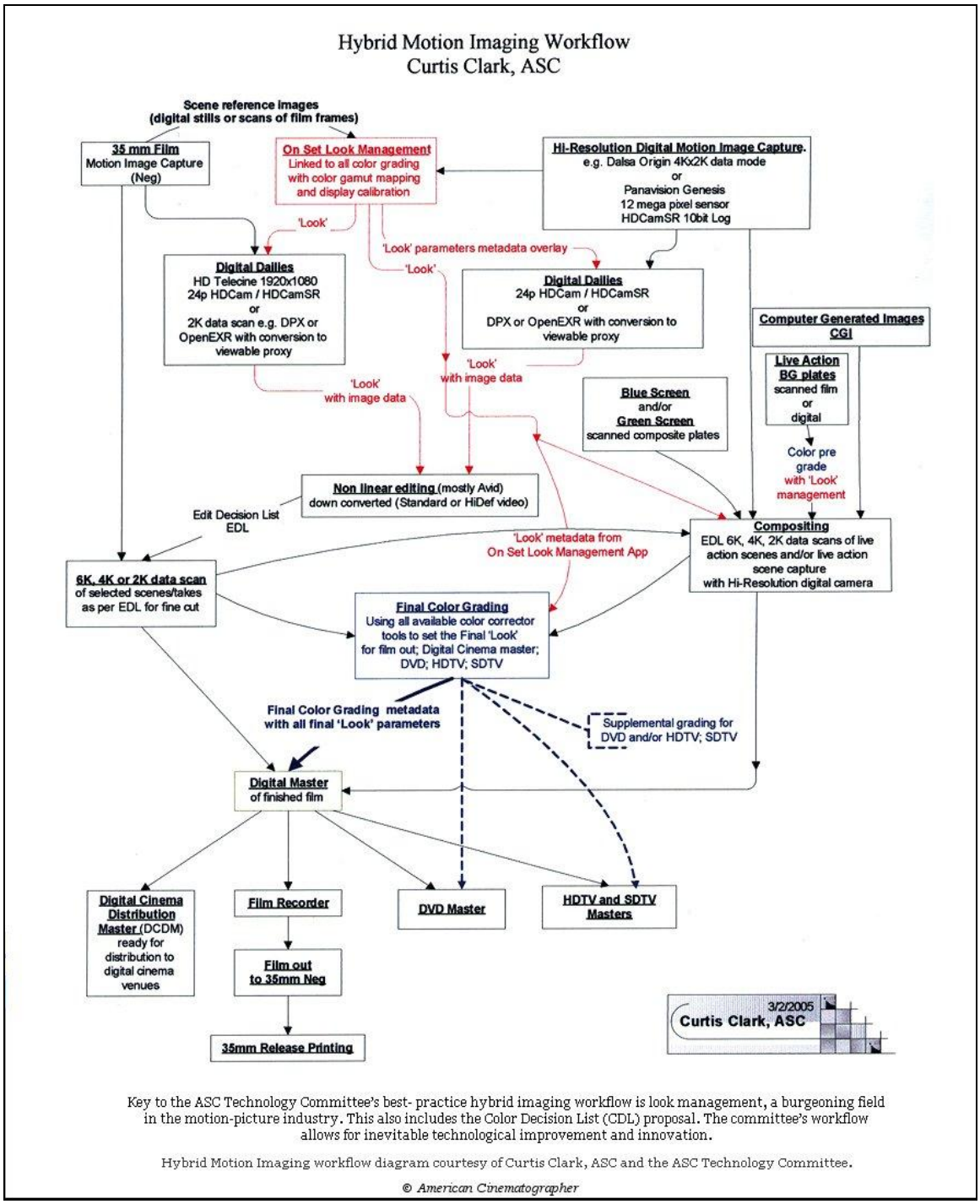
[560] Debra Kaufmann, "Metadata's Impact on Artistic Intent." *American Cinematographer*, December 2003.
[561] See Bob Fisher, "Tomorrow's Technology: Exploring the Digital Intermediate" AC April 2004 124. Cinematographer Alan Caso, ASC, (*Six Feet Under*) was Levinson's co-chair.
[562] Douglas Bankston. "The Color-Space Conundrum, Part 1" *American Cinematographer*. January 2005, and Douglas Bankston. "The Color-Space Conundrum, Part 2" *American Cinematographer*. April 2005. Although Bankston was credited with these articles, Curtis Clark told me they were collaboratively written by over twenty cinematographers, technologists, and specialists, most of whom were members of the Technology Committee.



Key to the ASC Technology Committee's best- practice hybrid imaging workflow is look management, a burgeoning field in the motion-picture industry. This also includes the Color Decision List (CDL) proposal. The committee's workflow allows for inevitable technological improvement and innovation.

Hybrid Motion Imaging workflow diagram courtesy of Curtis Clark, ASC and the ASC Technology Committee.

Figure 46. ASC Technology Committee hybrid film-digital workflow from *American Cinematographer*, 2005. Note the "look management" procedures outlined in red (red in the original) and Digital Cinema Distribution Master (DCDM) output per the DCI specification.

editor's choices during editing. The CDL would carry cinematographers' choices about color through a production workflow. A practice like this, the article stated, would lessen the need for the cinematographer to be present in post-production (therefore more efficient and cost-effective) and, if adopted early enough in the production process, would avoid the problem of editors using footage outside the limits of the look a cinematographer had established. In the delicate exercises of craft authority, this new ability to guide the work of another craft could be a double-edged sword.

Through 2005, the DI subcommittee released several technical white papers on the CDL that would later guide manufacturers' creation of metadata processes in their cameras and color correctors.[563] In ambitious documents like these, cinematographers were beginning the process of translating their practices from a film-based craft to a hybrid of film, electronic, and digital imaging and, in doing so, proposing digitally-based apparatus that would preserve cinematographers' authority in familiar forms. In November 2003, DCI released a statement on the future digital cinema architecture, stating its position that theatrical digital projection, which was currently being developed at 2K resolution (2048x1080), should move toward being "4K ready," that is, capable of projecting images at up to 4K resolution (4096x2160).[564] This established an important benchmark for SMPTE's DC28 group and manufacturers working on the next generation of projectors. DCI's statement included supporting quotations from NATO's John

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563 See, for example, A. B. Benitez, "Timecodes and Keycodes for the ASC CDL," *Proposal Document*, ASC Technology Committee's Digital Intermediate Subcommittee, August 17, 2005; J. Pines, D. Reisner, "Digital Color Decision List (CDL) Interchange Transfer Functions," *Working Document*, ASC Technology Committee's Digital Intermediate Subcommittee, March 2, 2005. A. B. Benitez, "XML Exchange Format for Color Decision Lists," *Proposal Document*, ASC Technology Committee's Digital Intermediate Subcommittee, March 14, 2005.

564 Texas Instruments, JVC, and Kodak demonstrated 2K prototype projectors in 2003. Most films continued to be finished with a 2K workflow, which many considered an adequate replacement for film-look. The capacity of theatrical projection for 4K, though, allowed for 3D projection to become a reality. 3-D projection requires a doubling of the data rate—thus, movies could be mastered at 2K resolution, converted to 3D, and projected on 4K ready projectors.

Fithian, the ETC's Charles Schwarz, and, for the first time, the ASC's President Richard Crudo (who had succeeded Steven Poster in January). Crudo said:

> We applaud DCI's commitment to setting the highest possible standards for the future of cinema. Some of our most illustrious members contributed to designing and producing a mini-movie that will enable the industry to better evaluate the technical performance of digital cinema systems, and also judge their capacity for retaining nuances in the original images which are designed to evoke emotional responses.[565]

Crudo's insistence on "emotional response" as a criteria of evaluation would be built into the design of the ASC's "mini-movie" (discussed below), but in the context of this DCI press release it reminds us that the cinematographers, for all of their effort to conform to a technocratic revision of the infrastructure of the industry, still sought to present their work as creative, expressive, affective.

In fact, there was still some controversy as to what "resolution" best emulated "film-look" and whether video- or digital would ever emulate the affective possibilities of film. Vittorio Storaro, among others, had complained that "film-look" was being abandoned to accommodate the technological capacity of the moment. During an online Q&A back in 2000 he had asked:

> Film resolution is around 6K with enormous levels of color. Video is 2K with many fewer levels of color. Yet instead of raising video quality closer to film, the industry seems to be settling for pulling film down to video quality. What can we do as cinematographers to change this tendency?[566]

As Clark described it, the DCI never attempted to standardize any resolution preceding the mastering stage, but its decisions would ultimately reverberate all through the production process:

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565 "DCI Member Studios Unanimously Approve Pursuit of Delivery Systems Architecture." Digital Cinema Initiatives Press Release. November 12, 2003. <http://www.dcimovies.com/press/11-12-03.html> Accessed June 6, 2011.

566 Vittorio Storaro ICG chat transcript, Sep 23, 2000.

> That was always viewed as out of scope, being left to individual choice. So a studio or a production company might choose to do their final color mastering and compositing all the effect shots and everything at a very high resolution, maybe 6K, let's say. That might be what they want to archive. But when they go to make the distribution master, it will be either 2K or 4K to fall within the DCI Specification. That was the plan. What I think has happened though is that there is now a stake in the ground of what you aim at in motion picture production. And that is described by the number of pixels, by the color gamut and the bit depth of the image and frame rate and a whole lot of other things. I believe that the DCI Spec will end up being a target for production and post-production.[567]

Strictly speaking, film has no "resolution" that corresponds to a video or digital pixel-based description. To the extent that they are visible at all, the "grains" of film chemistry appear randomized and molecular rather than sharp-edged and blocky like pixels. This was a common reference in the alleged "warmth" of "film-look" over video or digital. However, film grain technology had developed to a point that film grain was only visible if an experienced cinematographer made a conscious design choice to show it. On the debatable point that digital scanning could accurately duplicate film grain, even at lower resolutions, the ASC was clearly prepared to cooperate with DCI moving forward in the standards setting process.

THE STEM MINI-MOVIE

Cinematographers' most explicit opportunity to inscribe their craft practice into digital cinema came in the so-called Standard Evaluation Material, or StEM. In early 2003, not long after the ASC Technology Committee was formed, Walt Ordway, DCI's Chief Technology Officer and Howard Lukk, the Director of Technology, approached the group about creating a short film that would, in the words of Clark, "stress test" digital systems. The StEM was to be a reference strip for evaluating digital projectors and image compression schemes. Crudo put it in more colorful terms:

[567] Curtis Clark, interview by the author, July 25, 2005, transcript.

> The whole gist of this film was to break compression and digital projection systems. Break them. We wanted to put a film up there that was the ultimate challenge to these systems and see if they could meet the test and take this material and put it out there in a way that we saw it to our liking.[568]

Members of the technology committee met with the DCI and collaboratively created a list of objective criteria to test projectors and compression technologies, such as contrast, flicker, and strobing. They also made a list of visual qualities that were difficult for those technologies to reproduce, such as smoke, fog, rain, motion blur, and specific effects such as magic hour light, aggressive camera moves, and bicycle spokes against a picket fence.[569]

Clark assembled a team of cinematographers to create a mini-movie that include all of the elements requested by the DCI. As Clark described their deliberations, it was very important to the group that the test strip have the "look and feel" of a feature film, "like it was a clip from or a sequence from a movie that was a very high end project, you know, high-production value, Hollywood-based movie and what we associate with that in terms of production values."[570] They wanted the strip to have a narrative, and project the sort of emotional qualities that were the mark of masterful cinematography. Committee member Dante Spinotti suggested that an Italian wedding could achieve that effect. He described his scenario to *Daily Variety*:

> The bride is dressed in white, the groom in black, with different colors in other costumes and backgrounds. The bride and groom and their wedding party come out of a church, walk down a street, around a corner and arrive at a crowded dinner table in the middle of a village square.[571] (See)

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[568] Richard Crudo, interview by the author, August 26, 2005, transcript.
[569] Kerrie Mitchell. "Line Items: Digital Projection Screen Test." *Filmmaker* 12:3 (Spring 2004), p 93.
[570] Curtis Clark, interview by the author, July 25, 2005, transcript. Other descriptions of the StEM can be found in Bob Fisher. "Tomorrow's Technology: The ASC and DCI Join Forces to Set Standards for Digital Projection." *American Cinematographer*. (January 2004) p 121, Dave McNary. "Standardized Digital Projecter Test Bows." *Daily Variety.* September 26, 2003, and. "ASC and DCI Creating Digital Cinema Test Film. *Cinematography.com*. January 24, 2003. <http://www.cinematography.com/index.asp?newsID=101> (Accessed January 29, 2004).
[571] McNary. "Standardized Digital Projecter Test Bows."

Figure 47. Still from the ASC-DCI StEM mini-movie.

The wedding procession was filmed in a master shot in six different lighting conditions, including daytime, dusk, on a warm night and on a cool night, and in the rain. The opening shot featured a clear blue sky with a cascade of confetti, which would require an extraordinary facility with detail, color, and movement for any digital projector. (See Figure 48)[573] Peter James, ASC, Curtis Clark, ASC, and others served as the film's producers and Allen Daviau, ASC, served as director and cinematographer. Roy Wagner, Michael Negrin, and Peter Anderson, all members of the ASC, were also on the crew. The film had a cast of dozens, including jugglers and a man on a bicycle. It was shot on film, using 35mm Anamorphic, and Super 35 and 65mm film. Jerry Pierce, a senior vice-president for Technology at Universal Studios, and chair of the d-cinema subcommittee, was quoted in *AC*, "The footage was to be embedded with subtle details in

[573] These StEM still frames were used in a podcast by David Reisner, a digital cinema consultant and secretary of the ASC Technology Committee's DI and Advanced Imaging sub-committees. He also contributed to The Color-Space Conundrum primer and the *American Cinematographers Manual*, among other projects. Home Theater Geeks Podcast 45. <http://www.ultimateavmag.com>

highlights and shadows and nuances of color and contrast, essential elements of visual storytelling."[574] Crudo described it as "raising expectations for objective evaluations of technical performance, while allowing for subjective assessments of how they affect our ability to evoke emotional responses from audiences."[575] The StEM was edited by the British cinematographer Geoff Boyle and overlaid with commentary tracks by Daviau and DCI's Lukk, describing what image qualities was being tested, shot by shot. After digital mastering (with a DI), it was released in March 2004 in a variety of formats, including 2K and 4K versions. Technology companies were then invited to purchase copies from SMPTE to evaluate their equipment at prices ranging from $1500 to $4000.[576]

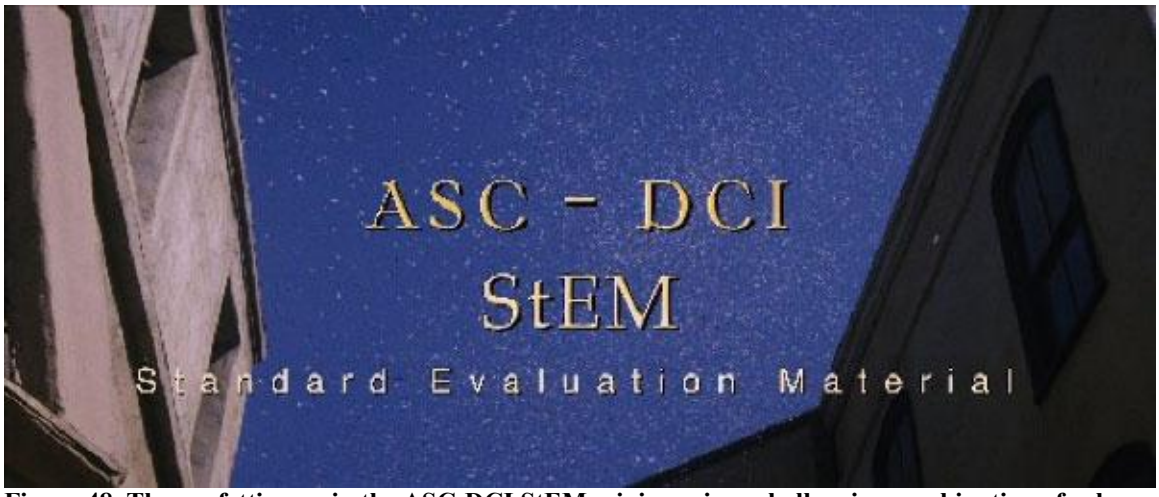

Figure 48. The confetti open in the ASC-DCI StEM mini-movie, a challenging combination of color rendition and fine detail intended to stress-test digital projectors. The confetti may not be visible here; most computer printers aren't able to show the detail in this image.

The StEM may be the quintessential example of what John Caldwell has called a "fully embedded deep text." It was not meant for a paying audience, or any audience beyond other cinematographers and a small circle of technologists and designers. I was only able to see the movie once in the context of a technical demonstration and had to

[574] See Fisher, "Tomorrow's Technology," and McNary. "Standardized Digital Projecter Test Bows."
[575] Ibid. 122
[576] SMPTE website. <http://store.smtpe.org/category-s/31.htm>

rely on my notes to describe it for this section. In designing the StEM, cinematographers faced an interesting challenge, and one that a craft culture rarely meets: creating a collective text that displayed their craft in its best light, with its most challenging technical scenarios and highest aspirations.

However, it may be the insistence on a narrative frame that is most instructive. It illustrates the extent to which the art of cinematography—its relationship to style and expressiveness—has been founded on the basis of narrative. Puzzles of technique and style are always articulated to problems of story, mood, and character. The choice of an Italian wedding is revealing: weddings are a scene/genre set-piece with a long and venerable tradition in motion pictures (and therefore cinematography). From *The Father of the Bride* (1950) to *The Godfather* (1972), or from *The Deer Hunter* (1979) to *Four Weddings and a Funeral* (1994), a wedding has been a reliable test of cinematographers' ability to balance genre and convention with expressivity and their own visual style. To meet this challenge for the DCI, the ASC assembled its best and brightest and reached for the Hollywood polish. The film features elaborate camera moves on tracks, crane moves, and aggressive pans.[579] The lighting is impeccably motivated—by sun, practical fixtures, or candles, depending on the clip—with appropriate effects lighting, figure modeling, and stately compositions, all firmly within the bounds of the genre convention and the broader sweep of classical style.

The StEM was screened for the ASC Technology Committee at the DCL at the Hollywood Pacific Theatre.[580] Charles Schwarz described that screening:

> Really, what the cinematographers were most interested in was when we showed a film print and the digital version side by side…we first put the best film projector into the lab we could with the best lenses, after much testing, and then the element was a first-generation film answer print that was timed by Allen

[579] McNary. "Standardized Digital Projecter Test Bows."
[580] Described in interviews with Stephen Lighthill and Curtis Clark.

> Daviau. When he was satisfied, then at that point the digital was matched to that in the lab, in the very theater where it would be shown, and then we are able to show those two side by side, split screen, so that you could sit there and actually look at the very best film can be compared to the digital alternatives.[581]

According to Schwarz they compared favorably. However, it is the scene inside the Hollywood Pacific that interests me, as cinematographers sat to watch a mini-movie that showcased a certain uncompromising conception of cinematography as an art form, in a faded movie palace, on a 50-foot screen—a venue in which their cinematography would rarely if ever be seen. The persistence of this ideal of cinema, and cinematography, was expressed with remarkable clarity at that moment. I don't think the irony was lost on cinematographers, for, as Clark told me:

> You know, that is one of those controversies. So many of my associates and people I know in this town fear that probably more than anything, losing that big screen presentation, because that is what we associate with cinema, the 35 or 45 foot screens. That is why the Digital Cinema Lab is so interesting; it's a 50-foot screen, one of the few 50-foot screens that we have as a place to assess and compare film and digital images, and here it is in this picture palace, you know. It is pretty poignant. I think that's the question we going to be asking: twenty years from now how will people be accessing this kind of entertainment?[582]

The irony of the StEM was that it enacted the highest aims of cinematography, the cinematographer as an artist, painting with light, and was grounded in a value centered entirely on film-look, even as the divisions between shooting for television, the commercials, documentaries, or feature films were becoming less meaningful with each passing year. Cinematographers were learning that the "show" could originate on many mediums and find an audience in as many different forms, but the big-screen motion picture remained the target—as a technological regime and (or perhaps because of) the hierarchies of this culture of production. Meanwhile, mastery in the new cinematography would lay in the ability to establish and *manage* signature looks—not necessarily film-

[581] Charles S. Swartz, interview by the author, March 27, 2005, transcript.
[582] Curtis Clark, interview by the author, July 25, 2005, transcript.

looks—while keeping them consistent through an extraordinarily malleable digital rather than film-based production processes. The key to that authority would be the languages and procedures the Technology sub-committees were creating in other, less historically poignant spaces.

THE DCI SPECIFICATION AND AFTER

In 2004, the AMPAS entered the d-cinema field by initiating the Image Interchange Framework (IIF) project, an effort to standardize how elements created in motion picture production are exchanged during the production process. As most of the stages of production turned toward digital creation, the problem of integrating film or video, visual effects, post-production, audio in the mastering process was becoming burdensome. The goal of the IIF was to propose file formats, color transform tools, reference images, and documentation, collect feedback, and submit a final "toolkit" to SMPTE for standardization. The toolkit was made available for free to participants willing to evaluate it, through the end of 2011.[583] After 2006, the Sci-Tech Council began studying problems associated with digital archiving and preservation and issued a report, *The Digital Dilemma*, in 2007.[584]

Also in 2004, DCI selected a compression technology (MotionJPEG2000) as a basis for digital cinema. The compression scheme dated from 2000 and was the product of collaboration between MPEG and SMPTE, in which media could be transported in MPEG's MP4 file format but compressed with the JPEG codec. MPEG file formats were

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[583] The IIF had its first application in 2010, when Curtis Clark was brought it by Francis Kenny, ASC, to consult on the production of the FX cable network series, *Justified*. The program was shot with digital cameras, but adopted the IIF to maintain its film-look color and resolution through post-production. See AMPAS, "Image Interchange Framework" <http://www.oscars.org/science-technology/council/projects> (Accessed June 23, 2011) and Stephanie Argy "*Justified* Adopts Academy's New Workflow." *American Cinematographer* 92:3 March 2011 16.

[584] The report is available online at <http://www.oscars.org/science-technology/council/projects/digitaldilemma/> Accessed June 23, 2011.

already being used in DVDs and for the deployment of digital television, but using the JPEG2000 codec meant the media content was less compressed ("visually lossless"), less prone to error, more easily scalable between screen sizes, and had more capability for synchronizing with audio or metadata than in other codecs. Although cinematographers had resisted compression, this choice was viewed a reasonable compromise.[585]

With the compression decision established, DCI released its full specification for digital cinema in July 2005. The DCI specification is a remarkable document that translates and re-establishes a technological hegemony (d-cinema) in place of another (four-perf 35). It defines language and procedures for d-cinema, it picks winners from among competing schemes for compression and security. It laid no technological or aesthetic prescriptions for filmmakers, but in establishing the criteria for what was called the Digital Cinema Distribution Master (DCDM), it created a technical boundary that would guide technologists, craft workers, and creative personnel on the production side of the industry. The sheer number of supportive quotations cited in the press release issued by DCI signals the import of the announcement, including statements from each of the seven studio members and a representative from Pixar, the AMPAS, John Fithian of NATO, Charles Schwarz of the ETC, George Lucas, Robert Zemeckis, Robert Rodriguez, James Cameron, and the UK Film Trust. The ASC's Richard Crudo said:

> With the future hard upon us, part of [our] effort involved creation of the StEM film. Besides marking a great milestone in our traditional role as "guardian of the image," it also recalled one of the main reasons that led to the start of our organization in 1919. And though the industry may not yet realize that debt they

[585] The choice of MotionJPEG2000 was not universally praised. Bill Jaspar, CEO of Dolby Labs, said he did not understand DCI's decision to drop the MPEG standard and move to JPEG. JPEG compression requires more powerful (and expensive) servers and processors than MPEG, which is more focused on ease and speed of compression. Independent exhibitors in the U.S. and in overseas territories, such as India and China, complained that the DCI Specification was too stringent on visual quality and economically unrealistic for exhibitors that could not afford the servers and high-lumen projectors prescribed by d-cinema. See Patrick Frater. "India Slams Hollywood d-cinema." *Daily Variety*. March 28, 2007. 5

> owe this achievement, its significance will be plain to anyone who views a motion picture for many, many years to come.[586]

It's not clear in this statement if Crudo is referring to the "achievement" of the DCI specification, or the StEM, or perhaps both. In any case, given the time I've spent with cinematographers in the course of this project, I hear in his statement a tone of something like defiance, and the often-voiced sentiment that although the future of masterful cinematography is in doubt, in the StEM cinematographers have left this reminder of their legacy, a note in a bottle.

Chuck Goldwater left DCI in July 2005, the same month the DCI Specification was released, joining Christie/AIX's Cinedigm subsidiary to take charge of the marketing and deployment of their digital cinema projection systems.[587] ASC cinematographers continued to participate on industry panels fixed more than ever on problems of collaboration, such as a panel at the Beverly Hills Film Festival that spring that focused on "hybrid cinematography" and included cinematographers, colorists, and editors.[588]

DCI focused on revising and updating the DCI Specification, including, in July 2007, a Stereoscopic Digital Cinema Addendum that added criteria for 3-D cinema to the specification. Otherwise the group issued errata and worked on creating compliance test plans which it then licensed to outside providers. Also in 2007 an ad-hoc industry trade group, the "Inter-society Digital Cinema Forum" was formed as a subcommittee of "Inter-society for the Enhancement of Cinema Presentation,"[589] dedicated to creating best practices, making recommendations to DCI and SMPTE, and encouraging de facto standards among its members. In 2011, Jerry Pierce (also of the ASC Technology

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[586] Richard Crudo, interview by the author, August 26, 2005, transcript.
[587] Ben Fritz. "Digital Pic Push Lands Goldwater." *Daily Variety*. August 1, 2005. 4
[588] "Datebook," *Variety*, April 15, 2005, 10.
[589] ISECP was founded in 1978 by a Kodak executive and now includes members of five industry trade groups, including NATO and the MPAA, as well as representatives from over forty member firms, including studios, manufacturers, service providers, and the like.

Committee) was Chair of this group. SMPTE's DC28 Working Group was renamed the 21DC Digital Cinema Technology Committee and began publishing standards documents on the DCDM and Digital Cinema Package requirements. There were still many technological hurdles for d-cinema to overcome, primarily in security, transport, and facilities management, but the question that would dominate in the immediate future was economic, that is, how to finance the widespread adoption of digital cinema among exhibitors.

In 2004, the ARRI Group, a camera manufacturer with many devotees among cinematographers, produced a presentation titled "The Digital Age of Film," that predicted an 8- to 10-year horizon for film-based cinematography.[591] The firm released its first data-camera, the D20, that year, enlisting many cinematographers in its marketing. Unlike other data cameras released up to then, ARRI's camera looked like a film camera, with the familiar attachments and ergonomics cinematographers expected. However, ARRI and cinematographers still didn't consider the D20 a production camera. While suitable for television, it did not produce images of "cinema-quality," a limitation that ARRI recognized in its marketing. ARRI was looking ahead and doing R&D based on a European framework for digital cinema called MetaVision that uses meta-data to link production with post-production workflows. This, ARRI claimed, would "provide the necessary image quality but also reflect the needs of cinematographers used to working with film cameras."[592] Over the next few years, a data camera called the Red-One joined the Thomson Viper, Sony F900, and Panavision Genesis in the market for digital production cameras. ARRI released its digital cinema camera, the Alexa, in April

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591 "The Digital Age of Film," Powerpoint presentation, ARRI Group. This document was provided to me by one of my informants. ARRI's research agenda was also mentioned to me by Bill Bennett, Robert Primes, and Curtis Clark in our interviews.

592 "No Film but Still an ARRI - a digital film-style camera for television applications" *ARRI News Brochure*. <http://archiv.arri.de/infodown/news/0309_e.pdf >, Accessed May 18, 2004.

2010, gathering positive reviews for its quality images and "film style" modeling. The ASC continued to produce regular installments of its "camera assessment series," a testing program co-sponsored by the Producer Guild of America (PGA), started in 2005 under the supervision of David Stump, chair of the ASC Technology Committee's Camera sub-committee. The ASC Technology Committee grew in scope and size after its 2002 founding and now includes committees on previsualization (that is, the detailed modeling of a film's shots and look prior to production), enlightenment (dedicated to communicating the mission and recommendations of the technology committee), and workflow (promoting look management techniques). Other craft organizations, such as the Association of Cinema Editors and Art Directors Guild, have formed technology committees of their own to consider the implications of digitalization.[593]

CONCLUSION

The intensive period of intra-industry coordination that began after 2002 saw the standard-setting bodies, movie studios, and the ASC Technology Committee collaborate on a shared definition of d-cinema that to a great extent maintained existing institutional relationships between producers, studios, exhibitors, the craft areas, and old (and some new) technology providers. By focusing on the DCI Specification as an alternative standard to four-perf 35, a parallel physical, legal and discursive apparatus was devised that linked production practices on set or in the studio, with post-production, mastering, distribution, and exhibition. That apparatus was shaped by, and to some extent protected by, the historically-grounded interweaving of these groups' shared notions of cinema as an industry and art form. Cinematographers' role in building that apparatus was to devise digital practices and primers based on its own craft traditions and also in designing texts

[593] Doug Bankston. "Tomorrow's Technology: ASC Technology Committee Fourth Anniversary." *American Cinematographer*. December 2006.

like the StEM mini-movie, which showcased state-of-the-art feature-film qualities as a test-strip for emerging technologies seeking the imprimatur of standardization by SMPTE and the DCI consortium. By crafting a test film to a very high *craft* standard, the cinematographers inscribed and reasserted their own role in motion imaging while helping the studios erect a high barrier of entry to the revised "d-cinema" industry.

This successful collaboration over d-cinema had its bittersweet qualities. Since the late 1990s, cinematographers had been fending off gleeful claims of the "death of film" from the popular press, independent-minded filmmakers, the influential and tech-savvy producer George Lucas, and their counterparts in the trade press. They had, to a great extent, resisted those claims and found ways to express the particular craft authority of cinematography in new production spaces such as the digital colorists' suite and the video village. However, as 35mm film seemed to be entering a slow if inevitable decline as a distribution medium, the reality became clear: the cries that "film is dead" were not about film as a look, or a craft, or a production medium at all, but film as a *standard* on which was built the whole edifice of motion pictures. As the proliferation of inventive new styles indicated—hybrid film/video looks, animation, visual effects, motion capture, and 3-D, among others—35mm film was quickly becoming one among many possible "capture mediums" or "production formats" that could be used in the commission of "cinematography." It remained the popular choice in feature film production for a time, but, cut off from its place as the definitional technology, film would inevitably move toward a niche status. As digital imaging advanced, film-look (or film-look emulation) would become just another application in the digital bag of tricks.

Cinematographers' response to this was a turn toward look management, or the adoption of tools and techniques that aimed to protect the "creative intent" of cinematographers in the radical new malleability of the motion picture workflow. As

early as 2002, Kodak introduced software packages, called "Look Manager" and "Color Manager," promising its cinematographer clientele new levels of control of their image-making, from "pre-visualization through post-production."[594] Other packages and methodologies from other manufacturers soon followed, and the AMPAS' Image Interchange Framework sought to encode this structure of authority in a workflow that could be standardized across the ecology of studio. Such programs and "frameworks" offered tools for maintaining and extending craft authority, such as the ability for cinematographers to establish a palette for their work and keep a reference of that on the set on a calibrated laptop computer, or extend it into post-production using metadata and color look-up tables. Look management is not a new idea, at some level it has always been part of the job description of the cinematographer, but it emerged powerfully in this period as a solution to disappearance of the authorizing power of 35mm film. Mastery of the digital tools, not just to create looks in the moment, but to manage—i.e., monitor, guide, and protect—them has become a central piece of this craft culture's structure of authority and a guiding concern of the ASC and its Technology Committee. The cinematographers' move to design and maintain these new workflows is way of exerting control—of "baking in"—this craft's expressive contributions. Movie-making in the digital age is an art form that is becoming more collaborative, connected, and networked. But the question lingers whether this is another way of saying that its creators are subject to more uncertainty in questions of authorship and authority, with less access to craft-based claims to artfulness.

[594] Sheigh Crabtree. "Kodak software to aid DPs with color, images." *The Hollywood Reporter*. September 19, 2003.

Chapter 9: Conclusion

The future of cinematography belongs to a new race of young solitaries who will shoot films by putting their last penny into it and not let themselves be taken in by the material routines of the trade.

- Robert Bresson "Notes on the Cinematographer" (1975)[595]

The abiding vision of artistic independence and uncomplicated authorship has been part of movie-making for a long time. According to this dream the "material routines of the trade"—all of those vehicles, props and costumes, generators, lights, cables, and personnel—get in the way of cinema. If they could just fall away the cinema would be closer to…something. Reality? Clarity? Art? We hear it in the words of George Lucas, who praised digital technology for turning movies into a "painter's medium," or the director Robert Rodriguez, who expressed relief at doing away with the burden of craft workers in his digital studio, calling it "cinema with the lights on." Apparently the new apparatus carries powers of the Muse and Eros alike. In May 2011, cinematographer John Bailey discussed the Bresson quote above on his blog, writing, "He could have easily been writing of today's young filmmakers, intent on fulfilling their cinematic visions, even with a Canon 5D or with iPhone video."[596] There is certainly the echo of Bresson's appeal in the words of Lucas and Rodriguez, just as Bresson was echoing memories of the pre-institutional period of cinema, before the work of the director-cameraman was split and alienated by the studio-based division of labor. And Bresson's words could have been the first draft for the directors of the French New Wave and the

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595 Robert Bresson, "Notes on the cinematographer." (London: Quartet Encounters, 1986). In this quotation, Bresson is not referring to cinematography as a profession but rather used the term "cinematographer" to refer to the filmmaker whose vision shapes the film, something akin to the *auteur* posited in *les politiques des auteur* (i.e., the director).

596 John Bailey. "Robert Bresson: Notes on the Cinematographer." John Bailey's Bailiwick (blog) <http://www.ascmag.com/blog/2011/05/09/robert-bresson-notes-on-the-cinematographer/> Accessed May 11, 2011.

auteur theory's positioning of a single guiding personality as the expressive heart of cinema as a narrative medium.

There is a powerful attraction to the idea of a movie-making detached from apparatus and delivered to a state of clay under the sculptor's thumb. Any decision can be backed away from, any shot can be re-conceptualized or re-executed, any compromise flagged to be "fixed in post." In the time- and technologically-fraught work of film and television production, such malleability solves many problems. It has a special appeal to enterprises like Hollywood's production companies and studios, burdened by risk and tossed by waves of changing taste and fashion. For filmmakers attempting to get out from under the "tyranny" of craft, the discourse of digital offered another means to mask the labor of hundreds under the umbrellas of the "solitaries," the directors, producers, or movement leaders. Digitalization's familiar promises of frictionless flows of capital and information bled over into moviemaking with the promise of friction-free creativity.

In making movies, though, material routine and the friction of collaborative work are difficult to evade. Creative decisions are negotiated in and through the presence of complex technologies and even more complex professional relationships. The irony of the digital transition was that for craft workers, the promises of malleability and mobility that shaped digital R&D priorities came with a renewed, problematic relationship with the tools and practices of production. Rather than simplifying procedures and processes, digital tools added steps (as with the digital intermediate), complicated cinematographers' practices (as with on-set monitoring and the need for more careful lighting for HD video cameras), and threatened their definition of cinema (as a medium primarily for big-screen presentation). It isn't easy for craft workers to disavow their tools and practices, whatever the creative possibilities. And, of course, they are hardly inclined to make such a disavowal, as their authority is inextricably tied to technological

expertise and the culture of work that surrounds it. Craft workers conduct themselves in this paradox: the tools that execute their visions and inspire the creativity of their collaborators are at once powerful physical and discursive agents that constrain and condition that execution. Digitalization was a new phase in this ongoing struggle for authority and autonomy, but it would not change the reality of this paradox. It simply raised the stakes for cinematographers' working within it.

SOLITARIES AND CRAFT CULTURE

This study raises three related sets of questions about the study of media and the future practices of media production, all of which are implied in the Bresson quotation above. First, how do we conceptualize this form of work and how has digitalization changed that conception? After digitalization is the craft worker more (or less) able to bring craft authority to bear on creative decisions? For cinematographers, does that authority take the shape of an "artist" seeking out expressive goals, a "technician" focused on capturing and protecting assets, or a "look manager" conceptualizing workflows that do a little of both? Second, what does the shuffling of the material procedures of making media—the mingling, if not outright collapse, of preproduction, production, and post-production routines—mean for media as an industry, art form, and cultural process? Finally, what do digital production tools portend for the long-standing questions of authorship and authority in Hollywood and beyond?

I've used the trade stories, deep texts, and performances of critical competence among cinematographers to make sense of the complex process of creating media and maintaining authority in rapidly shifting systems of production.[598] In their words and practices we saw the significance of particular professional spaces, such as the set, the film laboratory, and the post-production suite. Control and definition of technological

[598] See Caldwell, *Production Culture*, 37-68.

systems like the production camera were part of those performances—fulfilling their work obligations while also protecting the craft-based definitions of that work. They also revealed the tension that exists between a craft's obligation to other craft workers and its particular investment in its established domains of authority. Consider, for example, the cinematographer's obligation to provide "coverage" for the editor according to conventional rules of continuity. Alongside these obligations, the cinematographer balances the goals of the director, who may develop a coverage plan that intentionally limits options in the editing room. And the cinematographer may have his own investments in style and the capacities of his tools that further shape that coverage plan. We saw how John Bailey's coverage choices in *The Anniversary Party* were balanced between the genre conventions of domestic drama, his sense of professionalism, and the limits of the video-based production. Specialized divisions of labor in film production began with the roughly Fordist goals of the movie factory in the 1920s and in later decades turned toward the less-structured, but still efficiency-seeking package-unit system. But we might consider how our image of a clean, uncomplicated division of labor in media production is—and always has been—something of a mirage. Technological competence can be mapped fairly neatly onto the division of labor—a cinematographer had better be intimately familiar with the camera—and to a great degree technologies function as authorizing agents in that system (not totalizing, insurmountable instruments of authority, but nonetheless important as resources to claim authority and in some cases used to enforce a limit on "what can be done"). However, many domains of authority in media production are not so neatly mapped out. As story ideas, visual concepts, looks, rhythms and moods are proposed, considered, and decided around a project, a great many people, from both the traditional above-the-line and below-the-line domains, are in a position to wield influence. I've suggested that one result of digitalization for

cinematographers was a sharpened sense of the finite opportunities to influence or shape the creative outcomes of a project. The ability to lock, or "bake in," your craft contribution in a way that demonstrates your value to the project has long been the coin of the realm, the decline of the 35mm four-perf standard threw that structure of authority into question.

As my narrative of Hollywood's digital turn shows, the threat to craft authority had two main sources: the radical malleability of the image afforded by digitalization, and the rise of alternative formats and devices for capturing motion images. Taken together, these two factors led to a proliferation of possible "looks" in film and television production. Television, especially in commercials and music videos, had been more experimental with its looks in the years leading to the digital transition, but for cinematographers the threat to "film look" for cinema production was the most significant disruption. As I described, these were seen as "unworthy," inferior to film and unsuitable for filmmaking. The most significant shift for cinematographers in this era, I would argue, was an acceptance of unusual, non-film looks into their craft practice. That shift necessitated a parallel shift in the discourse and practice of their craft—away from film-look as the defining feature of the work of cinematography and toward a notion of "look management." This was a refinement of their historical investment in "guarding the image." That foundational notion would not change, indeed, that guardian role was what they were striving to protect. But rather than centering on film as a medium, look management would increasingly turn toward a broader concept of defining and protecting the *workflows* used to create and realize their images. Instrumental concepts like the Color Decision List, Metadata schemes, and "hybrid workflow" maps developed by the ASC were tactical moves in the effort to maintain a role for the cinematographer in the new workflow-based production environment. The workflows might include film, video,

or digital imaging; it may include film labs or digital intermediate processes; it almost certainly entailed working more closely with new collaborators like the digital imaging technician and colorist. Although these instrumental concepts were clearly of a piece with the needs of the motion picture industry for efficiency and interoperability, we should not lose sight of how important they were to the durability of cinematography as a craft, an exercise of craft authority for "industry" but also for this craft culture's "artistic" claims. Would they get to choose the brushes with which they would "paint?"

Cinematographers' artfulness is central to their claim to craft authority. Positioning themselves in relation to art traditions like painting and photography is a rhetorical move in the struggle for craft authority but one based on real processes of aesthetic and technological exchanges between these art worlds over decades. They share common languages and internal debates over terms like representation, realism, color, and emotion as well as (with photography) an exchange of technologies such as lenses, lighting instruments, and the like. As fine art traditions, painting and photography enjoy greater prestige and a less-complicated relationship to authorship (if only in cultural perception), both of which are certainly of value to a cinematographer who was laboring in increasingly complicated systems of collaborative work and creative compromise. One of the great fears among cinematographers was the threat to such claims of artfulness. The diminishment of beauty in cinema through "inferior" media and tools was only part of the problem. Cinematographers were relatively confident that "quality" would continue to be valued by producers and directors. But the craft's ability to claim responsibility for that beauty was much less certain. New formats required extra effort, time, and money to reach those quality looks, and a cinematographer's reputation within the craft and the wider industry could be harmed by a "look" that as perceived as ugly or accidental. Moreover, with the new prominence of colorists and post-production finishing

of looks, to whom would the celebrated or denigrated film's "look" be credited? Who was the artist? I am not suggesting that cinematographers had some privileged claim to that artfulness prior to digitalization, rather that it was a less complicated claim in those earlier days: less fraught with the minefield of unfamiliar technology and, thanks to the sheltering affordances of 35mm film, protected in large degree from the "meddling" hands of other collaborators.

THE MATERIAL ROUTINES OF CINEMA

In July 2011, the two dominant film-based service providers in North America, competitors Technicolor and Deluxe, took the remarkable step of creating cooperative sub-contracting agreements that allowed each to shut down major portions of their film processing and printing operations, drastically reducing their film-based staffing and facilities in the process.[599] While film remained a fairly common medium for shooting movies—albeit quickly transferred into digital form for post-production—*Variety* reported that the once-profitable business of producing thousands of film prints for movie exhibition was in decline. "The death knell for 35mm film production," the reporter wrote, "has just gotten a lot louder." Hollywood's digital turn had many origins. Certainly, the cost-benefits of digital distribution and projection played a large role, driving the studios to coordinate an industry-wide transition away from the 35mm four-perf standard to digital exhibition in recent years. The roots go farther back, though. Efficiencies in editing and visual effects integration—seen first in television and commercial production in the 1980s—demonstrated the viability of digitalization for those steps in the movie production process. The transition to digital television, which was coordinated on national and supra-national level, and presumed rise of online distribution played a significant part. Technology companies such as Sony, Texas

[599] David Cohen, "Lab pact heralds Twilight of Film." *Variety* (July 18, 2011).

Instruments, and Kodak (among others) invested enormous sums in research and development of digital imaging for consumer and professional applications through the 1980s and 1990s. These efforts produced new digital techniques for scanning, revising, and re-printing film-based images, as well as high-definition video cameras that captured images suitable for large-screen presentations.

Clearly, the rise of digital cinematography affected the material routines of the trade. There were new collaborators like the colorist and digital imaging technician and the growing significance of visual effects supervisors. New workspaces like the DI suite and video village presented challenges to the cinematographer's traditional spheres of influence, but also presented opportunities to extend or elaborate those moments of influence. By some accounts the film laboratory and film timer declined in significance. Still, a great deal about the motion picture production process continued relatively unchanged. When video or digital cameras were used for principal photography, or the DI suite was used to revise or remediate a cinematographer's work produced using film, these were minor differences in their conception of the production process. As many cinematographers noted, the expense of film stock, processing, and camera rental is not a significant element in the budget of a motion picture, especially when compared to costs of properties, stars, and other above-the-line talent. Even for the camera department, the costs of personnel, travel, grip equipment and the like are more costly than film and cameras. Given that digital cinematography required more time and effort to achieve quality looks, digital cinematography was considered a wash in terms of budgeting. Although factor costs were one driver for the digital transition writ large, replacing film with digital was not a significant revision to cinematography in economic terms.

The question arises, though, what if you do not need a "camera department," as traditionally conceived? One of the consequences of digital cinematography—one that

owed much to the perceived "malleability" of the digital image—was to embolden directors to act as their own cinematographers. Producers began asking cinematographers to reduce their camera crews to something like a documentary-size team. These processes had been foreshadowed by the rise in amateur and independent production, going by various names such as DIY, microcinema, underground cinema, and so on, that helped spread an idea that the apparatus of professional filmmaking could be drastically reduced with digital cameras and digital editing. Some filmmakers, most notably Robert Rodriguez, Mike Figgis, and Steven Soderbergh, availed themselves of these possibilities to fill multiple "hyphenated" roles in their productions. In the commonplace practice of feature filmmaking, though, these filmmakers proved to be the exception. By and large, the role of cinematographer remained an important collaborator, even in films that seemed to disavow the traditional production process, such as *The Blair Witch Project*, *Timecode*, the Dogme movies, or the low-budget digital indies like *Tape* and *Personal Velocity* from InDigEnt Productions. All of these films were produced with experienced cinematographers on their crews.

It seems, then, that the significance of digital cinematography for the material realities of production had less to do with budgeting and personnel than the stylistic possibilities offered by the media of video and digital recording. Digital cameras offered several new possibilities in shooting technique. In video-based cinematography there was a new option for extremely long takes (as tapes were longer than rolls of film), which offered a new relationship to performance, allowing for more improvisation, longer scenes, and less reliance on tight scripting or storyboarding. The perceived "abundance" of videotape or disk space led directors to run shots longer or eschew the order to "cut" at all, letting scenes develop "organically." In advanced cameras, the sensing device could be detached from the recorder, offering new forms of camera mobility. Sometimes this

feeling of freedom contributed to more ad hoc methods on the set, or what some of my informants called a "run and gun" technique of setting up and getting shots very quickly, grabbing a few takes and moving on, seeking a kind of momentum in the performance and production process.

Some cinematographers found virtues in this development, especially if it led to documentary-style immediacy. In general, though, this development was unwelcome. Speed in production meant less time to assess the actors' blocking, less time for thoughtfully arranging lights to support narrative goals, less time to practice camera moves or figure out focal length effects. Film, by virtue of its perceived cost, scarcity, and temperamental nature, as well as its obscurity inside the two "black boxes" of the camera body and cinematographer's mind, had enforced a sort of discipline on the filmmaking process. In the film-based workflow, every second that the camera ran was "money through the gate." It focused all members of the crew quite forcefully on the stretch of time between "roll" and "cut." Video and digital cinematography did not abolish that discipline, but changed it subtly. A locus of authority shifted away from one aspect of the material dimension of cinema—the camera and the challenges of photochemical photography—toward a more abstracted arena: story. The new cameras offered new possibilities for approaches to narrative. Cinematographers like to say that they are "visual storytellers," but it's important to note that they are not involved in writing or conceiving film stories; this is the writer's role. And they are only partially involved in interpreting the stories; that work falls more to the producer or director. When the camera becomes less of a factor—less of a limitation—in visual and narrative possibilities, a cinematographer experiences it as a loss of authority. The choice of medium becomes a conceptual decision that may or may not include the craft worker. This is not to suggest that the video or digital camera was somehow limitless in its

possibilities, in fact, depending on the scenario, the new cameras could be more problematic than film cameras. As I said, this impact was subtle and abstracted. As one area of material discipline was replaced by a new discipline, the cinematographer's material locus of authority had less weight—literally and figuratively—in the creative process. Recovering it would, of necessity, be part of the definition of digital cinematography.

Perhaps the most profound material consequence of digital cinematography was not in on-set practices, or even in shooting technique and relation to narrative, but in blurring the definitions of the traditional steps in the production process. Special or visual effects, as I described, had long stood athwart the traditionally distinct stages of principal photography and post-production. Visual effects entailed both creating original images and integrating them in the assembly stage. It is a specialized area of the industry that employs cinematographers (among other craft areas, such as miniature makers and animators), but for many years it was not considered part of the broader craft practice of cinematography, which considered lighting and shooting live-action long-form narrative the mainstream of its craft practice. For visual effects personnel, the line between principal photography and post-production was almost meaningless. By the late 1990s, the DI began to erase that line for the rest of cinematography. The emergence of alternative recording formats made it even harder to define, as video and digital recording made it easier to start assembling a production while it was still in principal photography. I don't want to overstate this point. In most professional production, the three-stage model still prevails as a matter of practice and as an organizational principle: when people should be hired, when they do their work, deliver their product, and so on. Nonetheless, digitalization helped advance two significant revisions to traditional production methods that impacted cinematographers: it made previsualization a more

common practice, as well as the practice of using post-production adjustments to "finish" looks. The new prominence of these steps has muddled the flow of creative decision making for cinematographers. They enabled drastically different organizations of production that deviated from the three-stage model. In other words, there were new ways to make a "movie." For example, a filmmaker might take an iterative approach - planning, shooting, and finishing a project in small pieces, spreading production out over time, confident that a consistent, "continuous" look could be created at a later date. Likewise, she might accept a less "professional" sheen during production, knowing it can be added or approximated at later stages of production. If shots, scenes or "unmatched" looks can be melded at any point, a production can be broken into smaller functional pieces, with different crews responsible for different scenes of the script, different parts of a scenes, or even different shots within a scene. Visual effects and compositing techniques are especially relevant here as is the digital intermediate. To some extent filmmakers have always experimented with the production process, especially since the decline of the studio system. Nonetheless, digitalization undermined the supposed central role of principal photography, and with it, the authority of the cinematographer.

CRAFT AUTHORITY: USEFUL FICTIONS AND USEFUL FRICTIONS

Is craft simply an agent of industry, or is it something more? Is it a special, more dignified and creative category of labor? Is a profession or occupation or trade? Does it enjoy more autonomy, more control, and more determination of its own destiny than other forms of work? Or is that just a fiction useful to craft workers as they condition and interpret the means of production to match the interests of industry? Caldwell recognizes that these questions, from inside the idiosyncratic production culture of film and television, are almost meaningless. The communication strategies and rituals of this class of workers are built around the very inextricable nature of creative/technical cultural

production. Without them, and this culture, there simply would not be film or television as we think of it today. Hesmondhalgh and others in the cultural industries school continue to grapple with these questions, recognizing that there are moral, ethical, and political implications in how one chooses to define work and the workers' relationship to the structural forces that shape their practices, expressive modes, and technologies.

Like few other forms of work (academics comes to mind), cinematography has seemed to me a vaguely anachronistic kind of labor, one experienced (or perhaps masqueraded) as a way of life, shot through with traditions, rituals, and prejudices that seem out of place in a post-industrial age. But it also seemed to enjoy a special relationship to the political economy of media, one characterized by the relative autonomy provided by the esoteric, nineteenth-century foundations of its craft knowledge, a "priesthood" of specialized, arcane procedures and technologies built around classical notions of beauty, art, and cinema. It had a vexed relationship to authorship: constitutionally collaborative but with an identity that rested on concepts of creative autonomy, aesthetics, and artistic traditions. I wondered if this contradiction was recognized in craft culture and how it was managed. I also wondered how it would respond to the realities of the post-industrial network society, as processes like digitalization and globalization that have thrown other, similar forms of work into disarray. Was this craft resistant, if not immune, to some of these complications? If digitalization was a process of rationalization (or re-rationalization), it would mean applying new, post-industrial logics of malleability, acceleration, mobility, flexible labor, and automation to a craft tradition long based on fixity, hierarchy, scarce labor, and the laborious realities of mechanical and chemical processes. How would cinematographers respond?

Cinematographers do recognize and manage this contradiction. The constancy and tension of this aspect of craft sensibility comes from the bifurcated set of demands—the technical and artistic—they encounter in the course of their work every day; to some extent I think it defines cinematography to cinematographers. It is the emotional fuel behind the angry editorials that erupted in response to Lucas' claimed plans to abandon film, as in 2000 when Steven Poster wrote:

> Don't make the mistake of imagining that it will somehow no longer be necessary to design the composition and the movement of the frame, to design the quality and shape of the light, or to design the continuity of images from the beginning of the story to the very last shot so that audiences' emotions and souls will be touched by the stories we tell. Technology in any form will never make these skills unnecessary.[600]

As Poster's exhortation makes clear (and I heard similar sentiments many times over), cinematographers felt profoundly threatened by developments that seemed calculated to alienate craft workers from their creative contribution. The existence of such threats was not new—in fact it is part of the craft culture—and creative workers accept the need to fight for their seat at the tables where decisions get made. For the past eighty years, though, the means they had to make claims for their own authority had been sacrosanct. The stance taken by the ASC and the ASC Technology Committee illustrates how digitalization caught cinematographers in a crisis of uncertainty about their place in the Hollywood mode of production. Long sheltered by film as a legacy technology, cinematographers suddenly perceived the end of decades of relative autonomy at the top of the "below the line" hierarchy. The level of authority and creativity enjoyed by cinematographers has been relatively stable since the earliest days of the industry, waxing and waning with the strength of individual reputation, the institutions within which they worked, and craft familiarity with the tools at hand. The splintering of the package-unit

[600] Steven Poster, "When Will Film Be Dead?" *American Cinematographer*, August 2000, 134.

system into unforeseen varieties of hybrid workflows (from tightly-managed, high tech studio spectacles like *Attack of the Clones* to low-budget phenomena like *Personal Velocity*) led likewise to a splintering of formerly sacrosanct craft distinctions, and a labor environment in which a cinematographer might find her authority elevated almost "above-the-line" on some shows or diminished to that of a faceless journeyman on others. If, as Arendt wrote, the fate of the modern worker is to struggle to hold onto the moral authority that comes of applying one's own skill and judgment to an "amoral" task, then for cinematographers, the encounter with digitalization has renewed that struggle, with mixed results. The future of cinematography as a standalone "freelance" occupation was itself in doubt, as more and more cinematographers worked within studio-like institutions such as animation studios, special effects houses, or as in-house specialists for independents like George Lucas.

On the other side of this coin, though, technological change put cinematographers in a good position to shape future cinema technologies. In attempting to manage the promises and the threats presented by "unruly technologies" of digitalization, they adopted new tools and annexed subspecialties needed to preserve or in some cases re-imagine their craft role.[601] Their reflexive, "self-theorizing disposition," as Caldwell describes it, in concert with technical and artistic authority, resulted in a sort of pliable skepticism, a politic resistance, to digitalization that was useful in their handling of "inter-craft contention" and directors' and producers' "cultural branding" that threatened to undermine craft contributions.[602] As film has been pushed aside as the central medium of the art form, there has been room for new looks and new ways of telling stories, and the concept of workflow took on new significance as a resource in the constant struggle

[601] Caldwell, *Production Culture*, 324-325.
[602] Ibid.

for creative influence. After film, each workflow would have to be built anew, it must be *crafted,* by people knowledgeable about the stylistic aims and technical realities of the show—how it should look, how it will be distributed, how it will be watched. And, in many cases, those questions were as new to the directors and producers as they were to the craft workers.

For a great many productions within the mainstream of film, television, and commercial production, then, digitalization has ushered in a new era of craft authority, but one more centered on technology than aesthetics. Ironically, the malleability and creative prospects of digital images may be leading to a cultural ecology in which a concept of cinematography as a unified craft culture has begun to fade. That culture was preserved and perhaps enhanced by the efforts of groups like the ASC and the technology committee, and cinematographers like Allen Daviau, Curtis Clark and John Bailey, who made procedures, standards, demonstrations, and key texts to carve a path from film-based cinematography to digital cinematography. To do so, they engaged with new collaborators and expanded the membership of the ASC to "non-cinematographers." In 1998, *AC* acknowledged the changes they were just beginning to negotiate by changing its subtitle to read: "The International Journal of Film and Digital Production Techniques." In 2010, it changed the subtitle again, to "The International Journal of Motion Imaging." This conveys a more expansive notion of cinematography as a craft practice, defined by the product it produces rather than the technologies and techniques used to produce it. But that expansive notion allows for more practitioners as well, many of whom may not look, act, or define themselves as "cinematographers."

Despite the protestations of cinematographers that cinematography will always be an art world as much as a technical specialization, it seems clear that the Hollywood cinematographer's work of imagining looks and realizing images has become de-centered

from artful claims to some extent. In the new workflows there are unfamiliar negotiated territories - the ascendant stages of production such as pre-visualization, visual effect design, and post-production processes like digital intermediate; these are sites of creative decision-making that cinematographers have to push their way into if they want to make decisions that stick. They may be invited in, of course, by directors or producers that value their creative insights. They may win a seat at that table through experience, reputation, or a shelf full of awards. Increasingly, authority will come from new technical knowledge about workflow and look management. In any case, the trade has become even more invested in smoothing the collaborative process, enmeshed in a network of imaging technologies and personnel significantly more complex than the days of photochemical cinematography.

These may prove, if I may twist a phrase, to be useful frictions. Innovative new looks and stories may emerge from these collaborations as cinematographers explore the visual possibilities of the digital frame. The most celebrated work of cinematographers'—their golden ages—had come from fruitful collaboration. But they were collaborations that valorized the director-cinematographer connection and, crucially, cinematographers as artists in their own right, masking the degree to which cinematography was also a kind of labor, built from its own subspecialties and collaborations. This is what has been at stake for cinematographers in the era of digitalization: seeking to honor their past glories and protect their prerogatives in a time when the director-cinematographer connection seems weaker than ever. Their work threatened to become more anonymous, bureaucratic and technocratic, more akin to other forms of modern high-tech labor than the romantic image of a "man with a movie camera."

I see this research as responding to the work of scholars such as Caldwell and Hesmondhalgh, who have called for (and performed) empirical studies of creative labor in production contexts. I am doing so from within the domain of film studies, as well, which has had its own struggle over how to account for authorship and the nature of creative contribution in collaborative work. While I am aware that I have only begun to engage the methodological and theoretical complexities of such work, in general in this study I avoided the terms "authorship" and "autonomy," in favor of the term "authority." What this choice reveals is my theoretical commitment to acknowledging instability, contingency, and contradictions in the production process. By avoiding the connotations of the univocal "author," I hoped to convey a sense of structured, but negotiable, interplay around influence and decision-making in film, television, and other media production. The power to make "decisions that stick" is a matter of delegation (institutional, Fordist) but also comes from assertions of value (cultural and individual). I acknowledge that cinematography and other forms of creative work are constrained by industrial imperatives. To the extent that their craft practices are culturally constituted, though, they draw on the resources of idiosyncratic artful traditions, disparate forms of (and investments in) technical knowledge, and past practices rooted in personal experience and generational habits. These are significant forms of authority. For a craft tradition like cinematography they can be a kind of carrier wave for certain values and principles of what the media are for, how technologies are used, how narratives and styles should look and feel. If anything, I believe my informants' encounter with digitalization shows how these craft formations are not very well understood either historically or in contemporary production. It would be useful to expand this study beyond the elite cadre of cinematographers at the ASC—the self-appointed leaders of the craft culture—to study cinematographers in rank-and-file or in non-union positions. I wonder how they receive

and express the craft ideals as promulgated by the ASC. Similarly, I would like to expand my earlier questions about future definitions of cinematography. Given the workflow-based organization of production, how does the craft change when a project is of a different genre (domestic drama, for example, compared to action) or within a subspecialty like visual effects, or when a cinematographer is asked to "light" an animated film, as Roger Deakins was recently asked to "consult" on the animated films *Wall-E* (2008), *How to Train Your Dragon* (2010), and *Rango* (2011)?

My starting point for this study was the idea that spending time with cinematographers would yield interesting insights into digitalization and media culture. If I approached them as more than the sum of their specializations, I believed there might be implications for media studies and how we research media industries, cinema technology, and creative labor. My hope is that this work provides the groundwork for more research into the nature of and future of craft authority in the era of digitalization.

Appendix 1: List of Interviewed Cinematographers, Technologists, and Filmmakers

Name	Date	Description	Note
Jamie Babbitt	7/15/2004	Director	*The Quiet*
Lorette Bayle	7/29/2005	Filmmaker, Account Manager	Eastman Kodak Motion Picture Group
Bill Bennett	8/22/2005	ASC	Shot tests of Viper Filmstream
Non Chu	11/28/2004	Engineer, Kodak Motion Picture Group	Look Management System
Denny Clairmont	8/24/2005	Technologist, President	Clairmont Camera
Curtis Clark	7/25/2005	ASC	Chair, ASC Technology Committee
Richard Crudo	8/26/2005	ASC President	President (at time of interview)
Allen Daviau	3/22/2010	ASC	*Van Helsing*, Member of Technology Committee
Mike Figgis	11/29/2004	Director	*Timecode*, *Hotel*
Michael Goi	7/24/2005	ASC President	*Call Waiting*, extensive low-budget credits, straight to video, erotica. ASC president, 2009-present.
David Heuring	11/30/2004	Editor	*American Cinematographer*
Dane Lawing	3/25/2005	Cinematographer	NY-based, friend of Ellen Kuras
Stephen Lighthill	7/20/2005	ASC	*Nash Bridges* (TV), Instructor, American Film Institute
David Mullen	8/15/2004	ASC	*Jackpot*, *The Quiet*
Robert Primes	8/22/2005	ASC	*Baadaasssss!*, *MDs* (TV)
Patrick Stewart	7/22/2005	Cinematographer	*Timecode*, *Hotel*
David Stump	3/29/2005	ASC	Chair, ASC digital acquisition sub-committee of Technical Committee
Charles S. Swartz,	3/27/2005	CEO, Entertainment Technology Center	University of Southern California
Stephan Ukas-Bradley	8/24/2005	Product Manager-ARRI Digital	
Roy Wagner	3/25/2005	Cinematographer	*House* (TV), Workshop leader, "Cinematography's Digital Revolution" held at Plus8 Video

Appendix 2: Selected Filmography of Video- and Digital-Originated Movies, 1998-2004

Release Year	Film	Production formats	Cinematographer
1998	*Festen* (Dogme 1)	DV	Anthony Dod Mantle
1998	*Idioterne* (Dogme 2)	DV	Lars Von Trier
1999	*The Blair Witch Project*	16mm and NTSC video	Neal Fredericks
1999	*Star Wars: The Phantom Menace (select scenes in HD)*	Film/HD	David Tattersall
1999	*Julian Donkey Boy* (Dogma 6)	DV	Anthony Dod Mantle
1999	*Mifune's Last Song* (Dogma 3)	16mm	Anthony Dod Mantle
2000	*Bamboozled*	DV/Film	Ellen Kuras
2000	*Dancer in the Dark*	DV	Robby Muller
2000	*Chuck and Buck*	DV	Chuy Chavez
2000	*Timecode*	DV	Patrick Stewart
2000	*The King is Alive* (Dogma 4)	DV	Jens Schlosser
2001	*Anniversary Party*	DV/Film	John Bailey
2001	*Hotel*	DV	Patrick Stewart
2001	*Tape*	DV	Maryse Alberti
2001	*Jackpot*	HD - 24p	David Mullen
2001	*Ali (select scenes)*	Film/HD	Emmanuel Lubezki
2001	*Waking Life*	DV + animation	Rick Linklater, Tommy Pollatta
2002	*Full Frontal*	DV	Steven Soderbergh
2002	*Star Wars: Attack of the Clones*	HD - 24p	David Tattersall
2002	*Personal Velocity*	DV	Ellen Kuras
2002	*Spy Kids 2*	HD - 24p	Robert Rodriguez
2002	*28 Days Later*	DV	Anthony Dod Mantle
2003	*Once Upon a Time in Mexico*	HD - 24p	Robert Rodriguez
2003	*Tarnation*	DV, Super 8 and stills	Jonathon Caouette
2004	*Sky Captain and the World of Tomorrow*	HD - 24p	Eric Adkins
2004	*Polar Express*	DV + animation	Robert Presley
2004	*Collateral*	HD/film/RAW format data	Paul Cameron and Dion Beebe

Appendix 3: Interview Schedule

Interview Schedule

Semi-Structured Interviews with cinematographers
Project: "Crafting Post-celluloid Cinema"
PI: Christopher Lucas (clucas@mail.utexas.edu)
IRB: 2004-11-0083

Preliminary Questions

- Did you see films A-G? For each film: Was this film important for establishing new ideas about digital cinematography?
    - Did you take any visual technique from this film for your own work?
    - Has this film affected your conception of how a set operates? Any new work processes?

General probes about work processes

- What digital-based productions have you worked on?
- What sorts of digital tools have you used? Have you rejected? For what productions? What digital cameras specifically? Why that camera?
- What if anything in the day-to-day work on the set has changed when you used digital cameras?
- Are there generally more cinematographers on sets/productions now? More people involved in image-design decisions?
- Has digital altered the relationship between you and directors you work with? How have those changes been negotiated? On a personal level or with recourse of the union?
- How has the camera crew changed? Did the new cameras alter the relationship between your and your crew?
- Did digital capture alter the relationship between you and the special effects teams? Between the production design or art teams? What particular tools or technologies led to that change?
- What vendors do you work with? How important have they been as guides in the new technology?
- Would you say that manufacturers and vendors overstate their claims to cinematographers about digital camera equipment?
- Have you been approached to help design or influence the next generation of digital cameras?
- Who do you think makes the substantive decisions about design and capabilities of digital capture cameras?

- Are the claims manufacturers and vendors creating expectations about cinematography?
- How well do marketing and salespeople understand cinematography?
- Will digital capture cameras eventually surpass film cameras?
- How do you respond to the "film is dead" debate in the trade press? In the mainstream press?
- How do digital cameras save money for your department? How do they cost more money? What kinds of efficiencies have been found?
- Have you been asked to use digital cameras to speed up production?
- Will cinematography as a profession be undermined by digital? As a craft? As a guild/union?
- How has your relationship with the ICG changed in recent years? With the ASC? With new collectives like the Cinematography.com? Any other new organizations?
- How is renumeration being restructured for cinematographers? More or less? Is there a gap? Differences between the media?
- How important will it be for your future employment to be comfortable using digital capture?
- How is cinematography an international versus a national profession? Are digital cameras more common in one national cinema over another?

General probes about film style

- Have you discovered any tricks, new looks or aesthetic possibilities with the digital cameras you used?
- How would you describe the process of originating ideas on the set?
- How would you describe the process of resolving disputes on the set?
- Have you ever felt required to compromise an aesthetic value in order to accommodate the digital cameras? How so?
- Do you agree with this statement: digital technologies have a long way to go to measure up to film as a motion picture capture medium. As a delivery medium? As a archival medium?
- What art forms do you see digital cinematography most closely related to? Photography? Painting? How so?
- Is cinematography becoming more or less vital as an art form?
- Will aesthetic standards change for the better or worse as the result of digital capture? How so?

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